FINAL PROJECT REPORT

ONR Grant No. N00014-89-J-1030
Modification No. 2
"Navy Plastics Dialogue"

September 28, 1993

THE KEYSTONE CENTER

Keystone Science and Public Policy Program • Keystone Science School
Keystone Symposia on Molecular and Cellular Biology

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During the past two years, The Keystone Center has continued to convene the participants in the Keystone Dialogue on Navy Plastics Pollution Control on an as needed basis to implement the International Convention for the Prevention of Pollution from Ships, known as MARPOL, specifically Annex V which bans the discharge of plastic. The Navy Plastics Dialogue Group is composed of congressional staff, environmental community representatives, and the Navy. Participants have been working with Navy personnel during this time period to implement the recommendations from the report, Reducing Navy Plastic Pollution (1988), produced by the Dialogue Group, which outlined means to comply with the MARPOL Treaty.

The discussions at the meetings in the past two years have focused on: the development of new machines which will compact and process plastic and eliminate the need for storage of food waste; substitutions and reduction efforts in the supply centers and on-board ships; and the Report to Congress on U.S. Navy Compliance with the Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA). The Dialogue Group met in November 1991, June 1992, June 1993, and August 1993.

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PRIMARY OBJECTIVES AND SCOPE OF THE PROJECT:

During the past two years, The Keystone Center has continued to convene the participants in the Keystone Dialogue on Navy Plastics Pollution Control on an as needed basis.[1] Participants have been working with Navy personnel during this time period to implement the recommendations from the report, Reducing Navy Plastic Pollution (1988), produced by the Dialogue Group, which outlined means to comply with the MARPOL Treaty.

TECHNIQUES OR APPROACHES USED:

As a part of the process, the Dialogue participants (see attached participant list) have been meeting with Navy personnel from Chief of Naval Operations, Naval Supply Command (NAVSUP), Naval Sea Systems Command, Department of the Navy General Counsel, and the Environmental Protection Branch of the Naval Surface Warfare Center. The discussions have focused on: the development of new machines which will compact and process plastic and eliminate the need for storage of food waste; substitutions and reduction efforts in the supply centers and on-board ships; and the Report to Congress on U.S. Navy Compliance with the Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA). All of the meetings occurred in Washington, D.C. The Dialogue Group met in November 1991, June 1992, June 1993, and August 1993.

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[1]The Navy Plastics Dialogue began meeting in October 1987. At that time it was called the Ad Hoc Advisory Committee on Plastics.

Much of the discussions which occurred at the meetings held in late 1991, 1992 and 1993 focused on the Navy' Report to Congress. The Report to Congress was required by Congress in MPPRCA which was passed by Congress as the mechanism for insuring compliance by the United States with the International Convention for the Prevention of Pollution from Ships, known as MARPOL (which stands for Marine Pollution) specifically Annex V which bans the discharge of plastic.[2] In the Report, Congress asked the Navy to review actions being taken in response to MPPRCA, the schedule for achieving maximum compliance, impediments to full compliance by the mandated December 31, 1993 deadline, and recommended measures for achieving compliance.

In the earlier meetings, Dialogue participants reviewed drafts of the Report to Congress. The Dialogue participants were supportive of the Navy's efforts and understood the need for a five year extension for surface ships compliance. While Dialogue participants felt that the draft Report to Congress was well done, they raised questions about the treatment of special areas. In addition, they provided their thoughts on presentation, readability and understanding of the draft Report to Congress.

The Navy's Report to Congress was submitted to Congress in June 1933. (A copy of the Report is attached.) The Navy also submitted proposed legislative language which provided them with the five year extension needed for surface ships and the 15 year extension needed for submarines.

At the most recent meeting in August 1993, the Dialogue participants discussed legislative language beginning with the Navy's legislative proposal which would provide an extension for compliance with MPPRCA for both surface ships and submarines. The meeting concluded with Dialogue participants reaching agreement in principle on the language which would be offered

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[2]MARPOL was developed to begin regulating pollution from ships resulting from operational and accidental discharges of oil, chemicals, sewage, and garbage. Annex V of MARPOL focuses on the discharge of garbage from ships including a ban on the disposal of plastics at sea. Annex V went into effect on December 30, 1988.

as an amendment to the Department of Defense Authorization bill. Subsequent to that meeting, actual language was drafted and agreed upon.

On September 9, 1993, the amendment was offered by Senators Baucus and Chafee and supported by Senators Nunn and Thurmond. The Senate accepted the amendment to the Department of Defense Authorization bill which next goes to conference with the House of Representatives. A copy of the Congressional Record which includes the amendment and associated discussions on the Senate floor is attached.

At each of the four meetings, Dialogue participants were also briefed on the status of the Navy's efforts to develop the various pieces of equipment (plastic waste processor, shredder and pulper), the installation schedule for the equipment, and NAVSUP's efforts to find substitutes for plastic items.

FINDINGS AND IMPLICATIONS:

At end of the contract period, the Navy is proceeding to address the plastics management problems from two different directions: the development of the suite of machines to handle plastic and solid waste and substitution and reduction of plastic items at the supply centers and on-board ships.

The Dialogue Group provided input to the Navy as it drafted the Report to Congress. The Group has also worked with Navy personnel and Congressional staff to develop legislative language which was acceptable to all concerned. The amendment to the Department of Defense Authorization bill as adopted by the Senate provides an extension for compliance with MARPOL Annex V for both surface ships and submarines. Without the extension, all Navy ships would have to comply by January 1, 1994. With the extension, all surface ships will be in compliance by 1998 and submarines by 2008.

While the amendment has been adopted by the Senate, it must still be considered by the House/Senate Conference Committee. If the Conference Committee does not adopt the amendment, it is possible that the Navy will have to comply by January 1994.

In the process of reviewing the Navy's Report to Congress and the amendment language, concern about the Navy's activities in special areas was raised. In future meetings, the Dialogue Group will address the issues associated with special areas in a manner similar to those applied to plastics management.

As it has in the past, the Dialogue group will determine its future direction as it proceeds.

TECHNICAL INFORMATION:

Attached, to provide additional information on the Dialogue's efforts during the past two years, are copies of meeting summaries prepared for participants, a copy of the Navy's Report to Congress, and a copy of the Congressional Record which includes the amendment to the Department of Defense Authorization bill.

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September 28, 1993

AMENDMENT NO. 812

(Purpose: To amend the act to prevent pollution from ships to provide for the control of shipboard plastic and solid waste on certain ships owned or operated by the Department of the Navy)

Mr. NUNN. Mr. President, on behalf of Senators BAUCUS and CHAFEE, I send an amendment to the desk and ask for its immediate consideration.

The PRESIDING OFFICER. The clerk will report.

The assistant legislative clerk read as follows:

The Senator from Georgia [Mr. NUNN], for Mr. BAUCUS, for himself and Mr. CHAFEE, proposes an amendment numbered 812.

Mr. NUNN. Mr. President, I ask unanimous consent that the reading of the amendment be dispensed with.

The PRESIDING OFFICER. Without objection, it is so ordered.

The amendment is as follows:

On page 94, between lines 11 and 12, insert the following:

SEC. 338. SHIPBOARD PLASTIC AND SOLID WASTE CONTROL.

(a) SHORT TITLE.—This section may be cited as the "Act to Prevent Pollution from Ships Amendments of 1993."

(b) DEADLINE FOR COMPLIANCE BY SHIPS OWNED OR OPERATED BY THE DEPARTMENT OF THE NAVY WITH CERTAIN POLLUTION CONTROL CONVENTIONS.—Subsection (b)(2)(A) of section 3 of the Act to Prevent Pollution from Ships (33 U.S.C. 1902) is amended by striking out "after 5 years" and all that follows and inserting in lieu thereof ", subject to subsection (f) of this section, as follows:

"(i) After December 31, 1993, to all ships referred to in paragraph (1)(A) of this subsection other than those owned or operated by the Department of the Navy.

"(ii) Except as provided in subsection (c) of this section, after December 31, 1998, to all ships referred to in paragraph (1)(A) of this subsection other than submersibles owned or operated by the Department of the Navy when such submersibles are engaged in noncommercial service.

"(iii) Except as provided in subsection (c) of this section, after December 31, 2008, to all ships referred to in paragraph (1)(A) of this subsection.".

(c) SPECIAL AREA DISCHARGES.—Section 3 of such Act is amended—

(1) by redesignating subsections (c) and (d) as subsections (d) and (g), respectively; and

(2) by inserting after subsection (b) the following new subsection (c):

"(c) DISCHARGES IN SPECIAL AREAS.—(1) Not later than December 31, 2000, all surface vessels owned or operated by the Department of the Navy, and not later than December 31, 2008, all submersibles owned or operated by the Department of the Navy, shall comply with the special area requirements of Regulation 5 of Annex V of the Convention.

"(2) Not later than 3 years after the date of the enactment of the Act to Prevent Pollution from Ships Amendments of 1993, the Secretary of the Navy, shall, in consultation with the Secretary of State, the Secretary of Commerce, the Secretary of Transportation, and the Administrator of the Environmental Protection Agency, submit to the Congress a plan for the compliance by all vessels owned or operated by the Department of the Navy with the requirements set forth in paragraph (1) of this subsection. Such plan shall be submitted after opportunity for public participation in its preparation, and for public review and comment.

"(3) If the Navy plan for compliance demonstrates that compliance with the requirements set forth in paragraph (1) of this subsection is not technologically feasible in the case of certain vessels under certain circumstances, the plan shall include information describing—

"(A) the ships for which full compliance with the requirements of paragraph (1) of this subsection is not technologically feasible;

"(B) the technical and operational impediments to achieving such compliance;

"(C) a proposed alternative schedule for achieving such compliance as rapidly as is technologically feasible; and

"(D) such other information as the Secretary of the Navy considers relevant and appropriate.

"(4) Upon receipt of the compliance plan under paragraph (2) of this subsection, the Congress may modify the applicability of paragraph (1) of this subsection, as appropriate.".

(d) COMPLIANCE MEASURES.—Such section 3 is amended by inserting after subsection (d), as redesignated by subsection (c)(1), the following new subsection:

"(e) COMPLIANCE BY EXCLUDED VESSELS.—(1) The Secretary of the Navy shall develop and, as appropriate, support the development of technologies and practices for solid waste management aboard ships owned or operated by the Department of the Navy, including technologies and practices for the reduction of the waste stream generated aboard such ships, that are necessary to ensure the compliance of such ships with Annex V to the Convention on or before the dates referred to in subsections (b)(2)(A) and (c)(1) of this section.

"(2) Notwithstanding any effective date of the application of this section to a ship, the provisions of Annex V of the Convention with respect to the disposal of plastic shall apply to ships equipped with plastic processors required for the long-term collection and storage of plastic aboard ships of the Navy upon the installation of such processors in such ships.

"(3)(A) Within 12 months after the date of the enactment of the Act to Prevent Pollution from Ships Amendments of 1993, the Secretary of the Navy shall promulgate regulations applicable to ships referred to in subsection (b)(1)(A) of this section owned or operated by the Department of the Navy. The regulations shall be consistent with operational requirements of such ships and shall be revised from time to time in accordance with this subsection.

"(B) The regulations promulgated under subparagraph (A) of this paragraph shall include the following requirements:

"(i) That compacted trash discharged from submersibles be negatively buoyant and contain the minimum amount practicable of plastic.

"(ii) That plastics contaminated by substances other than food not be discharged overboard from any ship during the last 20 days before the ship enters port.

"(iii) That plastics contaminated by food not be discharged overboard from any ship during the last 3 days before the ship enters port.

"(4)(A) The Secretary of Defense shall publish in the Federal Register a report setting forth the names of ships provided with equipment enabling such ships to comply with Annex V to the Convention and describing the amount and nature of the discharges in special areas during the preceding year from ships referred to in subsection (b)(1)(A) of this section owned or operated by the Department of the Navy.".

(e) WAIVER AUTHORITY.—Such section 3, as amended by subsection (d), is further amended by inserting after subsection (e) the following new subsection:

"(f) WAIVER AUTHORITY.—The President may waive the effective dates of the requirements set forth in subsections (b)(2)(A) and (c) of this section and in subsection (f) of the Act to Prevent Pollution from Ships Amendments of 1993 if the President determines it to be in the paramount interest of the United States to do so. Any such waiver shall be for a period not in excess of 1 year. The President shall submit a report to the Congress each January on all waivers from the requirements of this section granted during the preceding calendar year, together with the reasons for granting such waivers.".

(f) OTHER ACTIONS.—(1) Not later than October 1, 1994, the Secretary of the Navy shall release a request for proposals for equipment (hereinafter in this subsection referred to as "plastics processor") required for the long-term collection and storage of plastic aboard ships of the Navy.

(2) Not later than July 1, 1996, the Secretary shall install the first production unit of the plastics processor on board a Navy ship.

(3) Not later than July 1, 1997, the Secretary shall complete the installation of plastics processors on board not less than 50 percent of the ships of the Navy that require such processors in order to comply with the provisions of section 3 of the Act to Prevent Pollution from Ships, as amended by subsections (b), (c), and (d) of this section.

(4) Not later than July 1, 1998, the Secretary shall complete the installation of plastics processors on board not less than 75 percent of the ships of the Navy that require such processors in order to comply with such provisions.

Mr. NUNN. Mr. President, this amendment will provide a fixed set of deadlines for the Navy to comply with the Marpol Convention. The Marpol Convention is the international agreement to which the United States is a signatory that regulates the disposal of plastics on the high seas and plastics and solid waste in environmentally sensitive special areas such as the Persian Gulf, the Mediterranean, and the North Sea.

This amendment requires the Navy to be in full compliance with the high seas plastics requirement by 1998 and special area requirements by the year 2000.

I urge the adoption of the amendment.

Mr. BAUCUS. Mr. President, my good friend, the distinguished ranking Republican on the Environment and Public Works Committee, and I join in offering this amendment to S. 1298, the Department of Defense authorization bill. This amendment will put the U.S. Navy on a strict schedule for compliance with the Marine Plastic Pollution Research and Control Act of 1987 and Annex V of the International Convention for the Prevention of Pollution by Ships [MARPOL].

This amendment is the result of some extraordinary cooperation on the part of the Navy, a number of environmental groups, the Keystone Center, and other parties to find a workable solution that protects the environment while recognizing the Navy's operational realities. This is the kind of cooperation that can overcome gridlock. I want to thank all those involved in the effort, especially Senator CHAFEE,

for their hard work and perseverance. I hope the spirit exemplified here will be reflected in the work of our committee on other environmental issues over the coming months.

Briefly, this amendment requires that the Navy end the discharge of plastics from all of its surface ships by December 31, 1998, and from its submarine fleet by December 31, 2008. The amendment also establishes an interim compliance schedule.

Mr. President, the Navy has undertaken a serious, good faith effort in recent years to reduce plastic pollution from its ships. In addition, it has special processing equipment currently under development that will allow it to meet the schedule set forth in this amendment.

Furthermore, the amendment requires the Navy to comply with the restrictions on the discharge of all solid waste within the so-called "Special Areas," such as the Mediterranean Sea and the Gulf of Mexico, by December 31, 2000, for its surface ships, and by December 31, 2008, for its submarines.

The amendment has the wholehearted support of the Department of the Navy and is endorsed by several environmental groups, including the Center for Marine Conservation, Defenders of Wildlife, Ocean Advocates, the American Cetacean Society, the American Oceans Campaign, and the Gulf Coast Fisherman's Environmental Defense Fund. It is worthy of my colleagues' support.

Mr. CHAFEE. Mr. President, today I rise to join my colleague, the chairman of the Committee on Environment and Public Works, Senator BAUCUS, in offering an amendment to a law that is within the jurisdiction of the Committee on Environment and Public Works, the Act to Prevent Pollution from Ships. The amendment deals with the U.S. Navy's compliance with the major requirements of MARPOL Annex V, an international treaty which restricts and prohibits the dumping of garbage from ships at sea.

Although the Department of the Navy has been developing innovative waste technologies in order to implement Annex V, the Department cannot feasibly comply with all of the legislated requirements by December 31, 1993. The Navy does, however, expect to achieve surface ship compliance with the Annex's plastic dumping provisions by 1998 and submarine compliance by 2008. I might add, Mr. President, the Navy has given priority status to this program and is working to accelerate development, procurement, delivery and installation of plastic waste processing equipment on board its fleet.

Mr. President, our amendment is straightforward and is intended to provide the Navy with a stringent but rational schedule for compliance with Annex V. First, the proposal would give the Navy a 5-year window for complete compliance with the plastic dumping provisions of Annex V for its surface fleet and a 15-year schedule for its submarine fleet. Second, the amendment requires the Navy to submit to a plan to Congress within 3 years on compliance with the Annex V provisions regarding no-dumping of waste within special areas. Further, as specified by the amendment, by December 31, 2000, all surface vessels and by December 31, 2008, all submarines operated or owned by the Navy must comply with the special area requirements.

This amendment represents the combined efforts of the Department of the Navy, the distinguished chairman of the Environment Committee, Senator BAUCUS, myself, and several environmental groups. I commend the Navy and the interested parties from the environmental community for the willingness to work together to find a solution. At this point, I would like to submit letters of support from six of the environmental groups involved in the negotiations on this amendment for the RECORD.

Mr. President, this amendment represents a commonsense approach to dealing with the requirements of Annex V and establishes a clear-cut schedule for Navy compliance. I urge my colleagues to support the amendment.

There being no objection, the letters were ordered to be printed in the RECORD, as follows:

SEPTEMBER 8, 1993.

Hon. SAM NUNN,
Hon. STROM THURMOND,
Hon. MAX BAUCUS,
Hon. JOHN CHAFEE,
U.S. Senate, Washington, DC.

DEAR SENATORS NUNN, THURMOND, BAUCUS, and CHAFEE: On behalf of the following undersigned environmental organizations, we endorse the introduction of an amendment to the Department of Defense Authorization Bill, S. 1298, by Senators Baucus and Chafee on the Senate floor. As environmental members of the Navy Plastics Dialogue/Ad Hoc Advisory Committee on Plastics facilitated by the Keystone Center, we have been working closely with the Navy since 1987 on helping them solve their plastics and solid waste discharge problems.

The Baucus/Chafee amendment would give the Navy a five year schedule for complete compliance with the plastic dumping provisions of Annex V of the MARPOL Protocol for its surface fleet. Given the Navy's success so far in eliminating the overboard discharge of plastic debris, its expeditious development of a prototype for plastics waste processing, and the time necessary for procurement of said equipment, we feel this time frame is a legitimate one. The amendment will also require the Navy to report to Congress within three years on how they intend to comply, both technologically and environmentally, with the Annex V provisions for no-dumping of waste within special areas. The language in this provision, as part of a compromise, is acceptable to us. We welcome the opportunity to continue to work with the Navy and key congressional staff on issues dealing with special areas as we have in the past with the plastics' issue.

Because of some logistics problems beyond our control, we were unable to reach agreement with the Navy on appropriate language until today. We, however, do endorse the amendment and hope that Senators Baucus and Chafee will see fit to introduce it on the floor of the Senate this week. Thank you for your interest and concern with this issue.

Sincerely yours,

ALBERT M. MANVILLE, II, PH.D.,
SHARRON STEWART,
ANDREW PALMER, ESQ.,
SALLY ANN LENTZ, ESQ.,
BARBARA BRITTEN.

CENTER FOR MARINE CONSERVATION,
September 8, 1993.

Senator JOHN CHAFEE,
U.S. Senate, Washington, DC.

DEAR SENATOR CHAFEE: The Center for Marine Conservation supports the proposed amendment to the Department of Defense Authorization Bill, S. 1298, offered by you and Senator Baucus, which requires Navy to comply with the Marine Plastic Pollution Research and Control Act (MPPRCA). Specifically it requires compliance with plastic discharges restrictions by December 31, 1998 and all restrictions in Special Areas by December 31, 2000.

We have been active participants in the Navy Plastics Dialogue/Ad Hoc Advisory Committee on Plastics for six years. As such, we have worked with the Navy, other environmental groups, and congressional staff on the amendment to be offered. It has been our pleasure to work with a variety of groups who we understand are also endorsing this amendment.

We endorse this legislation and its intent. We look forward to working with the Navy and Congress on its implementation.

We appreciate your assistance in bringing Navy into compliance with the MPPRCA, and your work toward a better marine environment.

Sincerely,

KATHRYN J. O'HARA,
Pollution Prevention Director.

Mr. THURMOND. Mr. President, I support the amendment offered by my colleagues, Senator BAUCUS and Senator CHAFEE. Their amendment, called the Shipboard Plastics and Solid Waste Control Act of 1993, will extend compliance deadlines for restrictions on waste discharges at sea by U.S. Navy ships.

It is reasonable to extend the deadlines because technology does not exist which would enable the Navy to comply with current law. Without the compliance extensions contained in this amendment, no Navy ship could stay at sea longer than 3 days. This is, of course, a serious detriment to our most important defense interests which we in this chamber cannot permit to occur.

The Navy continues to work hard with industry to develop the needed technology and equipment. This amendment will give the Navy the time it needs to complete research and development, and to plan the ship modifications which will be required.

I urge my colleagues to support this amendment.

The PRESIDING OFFICER. Is there further debate? If not, the question is on agreeing to the amendment.

The amendment (No. 812) was agreed to.

Mr. NUNN. Mr. President, I move to reconsider the vote by which the amendment was agreed to.

Mr. WARNER. I move to lay that motion on the table.

NAVY PLASTICS DIALOGUE

Meeting Summary

November 4, 1991
Washington, D.C.

Mike Lesnick began the meeting by welcoming everyone and asking them to identify themselves and their organization for the benefit of the new people in the room. Jill Zilligan attended the meeting as a substitute for Betsy Schrader from the Center for Marine Conservation. Lesnick then noted that the purpose of the meeting was to review the Navy's Three Year Report to Congress and to provide feedback to the Navy on the document.

Before beginning the discussion of the document, Lesnick noted that he had just recently learned that Tad McCall is changing jobs. Tad is moving from the Office of the Secretary at DOD to EPA as the Deputy Assistant Administrator of the Office of Federal Facility Enforcement. Nancy Stehle suggested that members of the Dialogue sign a copy of the Navy Plastics poster to give Tad as a keepsake. Dialogue members agreed and a poster was brought to the meeting for everyone to sign.

Before the participants began going through the draft report page by page, Mike asked Tom Scarano to present the latest information on the pace of program implementation since it had changed in recent months. An accelerated timeline had been developed at the request of the fleet. Tom Scarano handed out a series of charts illustrating the new installation schedules for the compactor, solid waste pulper and plastic waste processor. (See Attachment A) The accelerated timeline would have all ships outfitted by the end of FY 1998 which is three years faster than originally anticipated. Scarano noted that the accelerated timeline presented is the worst case scenario. He feels they may be able to do better than projected if production rates turn out to be faster than currently expected.

According to Scarano, the Navy has been able to achieve this accelerated schedule due to several factors. First, access to the ships in the fleet will be accelerated due to the presence of fewer ships. Also, they may be able to make installations on some ships outside the current overhaul schedule. Thus, the revised ship installation schedule will save one year. Second, the development and production schedules have been shortened due to faster development of the pulper and plastic waste processor and the use of sole source procurement for initial production. These two changes will save a year each. The Navy will begin installation of the compactors and solid waste pulpers in FY 1993 and the plastic waste processors in FY 1995.

The timeline presented assumes a production rate which will mirror ship availability. If the equipment is not available due to production problems, all of the preparatory work will be completed when the ships are available. The equipment which was designed in modular units will then be installed when it becomes available. Scarano noted that the new schedule has a higher risk of problems associated with it but the Navy thinks it is an acceptable rate.

With the completion of the presentation on the accelerated timeline, Mike Lesnick then asked participants for their general reactions to the report on presentation, focus, length and gaps. In general, the participants thought that the document was well done. Concerns were raised about the requested exemption for discharge in special areas. The group requested additional information on what the Navy intends to do. The group also made editorial suggestions which would improve the presentation, readability and understanding of the report.

Next Steps

The Navy noted that the Three Year Report is due to Congress by January 1, 1992. It is their expectation that the report will be delivered to Congress on time.

Mike Lesnick then asked the group how they wanted to proceed in terms of the report. In response, the participants suggested that a press conference in January might be a fruitful course to pursue. Gina DeFerari, Rich Innes, Nancy Stehle and Al Manville agreed to work with each other to determine the viability of a press conference.

With that decided, the group considered options for future activities. After some discussion, the dialogue group decided that there was no longer a need for them to continue meeting. The group then adjourned.

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NAVY PLASTICS DIALOGUE

Meeting Summary

June 22, 1992
Washington, D.C.

Mike Lesnick began the meeting by welcoming everyone and asking them to identify agenda items they would like discussed. He noted that this would be the final meeting of the Navy Plastics Dialogue Group since the group had completed its tasks and future efforts could be done on a one-on-one basis. The meeting agenda focused on updates on the following:

- Naval Operations (Five Year Report to Congress, Status of Procurement and Installation)
- Naval Supply (NAVSUP) PRIME Program (Reorganization at Headquarters, Defense Logistics Agency, Recycled Products Market Development)
- David Taylor Research Center (Norfolk Recycling Program, Installation of New Technologies, Non-Navy Interest in New Technologies)
- Other Issues

The updates began with Larry Koss from the Office of the Chief of Naval Operations. He informed the group that the Navy's Five Year Report to Congress which the group reviewed at their last meeting in November 1991 still had not been sent to Congress. The Report is currently waiting approval by the Office of Management and Budget (OMB).

In terms of procurement of the machines (waste compactor, pulper and plastics processor, developed at the David Taylor Research Center by Craig Alig's staff, Larry Koss noted that the first contract for the waste compactor had been awarded. The first prototype is expected in 1993 and will be installed on-board a ship in 1994.

It is the Navy's expectation that 400 ships will be outfitted by 1998 with two or three of the machines designed to address the plastics problem (compactor, pulper and plastics processor).

In response to a question about funding, Larry Koss noted that the Navy staff were receiving adequate budgetary support and leadership. They were pleased with the appointment of the new head

of OP 45. He is an Admiral who has advanced up through the ranks. They feel it will increase the credibility of the plastics program.

Next, he stated that other organizations are taking an interest in the Navy's efforts to manage their plastic. The National Academy of Science (NAS) is examining the implementation of ANNEX 5. As a part of that review, NAS recently held a meeting in Annapolis to tour the David Taylor Research Center and see the three machines (compactor, pulper, and plastics processor) which had been developed to handle solid and plastic waste. Larry Koss also informed the group that the Navy has been receiving numerous inquiries about the various machines from NATO navies, businesses, cities, local governments, foreign governments and the World Bank.

In response to Larry Koss' remarks about the Five Year Report to Congress, Rich Innes commented that he and Gina DeFerarri would send a letter to OMB asking about the status of the Report hoping to encourage its release.

Jill Ballard from the PRIME Program in NAVSUP spoke next. She began by explaining that NAVSUP had been reorganized at Headquarters. (See the attached handouts for the organizational chart.) As a part of the reorganization, some of the Navy Depots' responsibilities have been consolidated with Defense Logistics Agency (DLA) Depots' responsibilities. As a part of the reorganization, NAVSUP is now responsible for other environmental initiatives such as solid waste reduction, recycling/recycled content, and performance-oriented packaging of hazardous materials.

On the supply front, the PRIME office expects to complete its review of all items it procures by December 1992. As of April 30, 1992, the PRIME Program had reviewed 525,695 items and revised 312,656 items. Thus, sixty percent of the items reviewed could be changed to reduce the amount of plastic. They have encountered the greatest difficulty in finding alternative packaging for electronics.

As a part of the effort to consolidate Navy and DLA depots responsibilities, the DLA has agreed to reduce plastics. (See the attached memorandum of June 15, 1992 from DLA.) In the memorandum, the NAVSUP PRIME program is identified as being the beginning of what will become a DOD-wide effort. This willingness by DLA to reduce plastics as a part of their procurement efforts is a significant change for the DLA and was noted as a very significant action by all involved. Jill Ballard observed that in addition to the need to comply with the MARPOL Treaty and Public Law 100-220, the added impetus for DLA to reduce plastics is the increased disposal costs they are incurring. Also, DLA has been receiving criticism from the General Accounting Office about their use of packaging.

Jill Ballard noted that as a part of the Navy's effort to improve the markets for recycled products, the Navy is one of the sponsors of a recycled products trade fair and showcase for government employees to inform them of the purchasing options they have. (See copy of program announcement.)

Craig Alig of the David Taylor Research Center spoke next. He noted that a wide variety of efforts are underway. In Norfolk, all of the ships are recycling their plastics. However, they are encountering some difficulties when they interface with the local land-based recycling effort. The institutional problem to be resolved is how to mesh the two programs together so that they complement each other.

Craig Alig indicated that NAVSEA has completed the plans for installing the new machines on-board ships. The installations have been prioritized with large ships getting higher priority. The schedule for installation of the machines has been determined in conjunction with the ships schedule for overhauls and the anticipated useful life of the ship.

For the new class of ships, DDG 51 destroyers, being built by the Navy, space was not planned initially for the three machines. To incorporate these new machines and the new concerns about plastics, the Navy is currently re-engineering the DDG 51 destroyers so that they can handle all three machines.

As the next step in the procurement process for the plastics processor, it is anticipated that engineering development models of the plastics processor will be tested on several ships in August 1992.

Craig Alig noted that the representatives from the World Bank, USDA Agricultural Pest and Health Inspection Service (APHIS) and some local governments in addition to other NATO countries' navies have expressed interest in acquiring the three machines which have been developed. The other navies are interested in all three machines as a comprehensive way to approach waste management. Other entities such as the World Bank, APHIS and local governments are specifically interested in the plastics processor. The World Bank is considering use of the machines as a part of their loan packages. APHIS is interested in requiring cruise ships to have the processors to handle their plastics waste or providing them for cruise ship use at each port. For APHIS, the plastics processor would eliminate the number one cause of contamination coming into the country, bacteria on food contaminated waste. The local governments who have contacted Craig Alig are considering the use of such machines to facilitate their ability to recycle and handle plastics. Thus, Alig noted that there appears to be interest in and a need for the development of a commercial model of the plastics processor. If commercial development were to occur, the production would not be done by the Navy. However, because the

Navy holds the patent on the plastics processor, it would receive a royalty on its production.

As a final issue of discussion, several participants expressed concern about the Navy's desire to receive an exemption which would allow for discharge in the Gulf of Mexico despite its special areas classification. The need and rationale for this exemption is stated in the Navy's Five Year Report to Congress. Some of the participants felt that such a request would encounter political difficulties and felt obliged to warn the Navy about their perceptions of this issue.

In closing, Mike Lesnick thanked everyone for their hard work and willingness to work together to take strides towards meeting the goal of zero plastics discharge by the Navy. Specifically, he thanked Nancy Stehle for her willingness to pursue such an effort. With that, everyone wished Nancy Stehle good luck in her future endeavors after she retires from the Navy.

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NAVY PLASTICS DIALOGUE

Meeting Summary

June 18, 1993
Washington, D.C.

Capt. Steinbrugge, Assistant Director, Environmental Protection, Safety and Occupational Health, began the meeting by welcoming everyone. He noted that the Navy's plastics program has grown significantly. It is now a $900 million program involving many people. He observed that much has been accomplished, but, more remains to be done. He also noted that as the federal government attempts to reduce spending, it will become increasingly difficult to support additional costs for programs such as plastics.

He stated that he was looking forward to hearing the Dialogue Group's comments on the Navy's efforts. He then informed them that the new Deputy Under Secretary for Defense and Environmental Security, Sherri Wasserman Goodman, was also anxious to hear the Dialogue Group's thoughts. As one way to begin that communication, Capt. Steinbrugge announced that Michael Lesnick, the Dialogue's facilitator from The Keystone Center, had agreed to meet with Deputy Under Secretary Goodman the following week to brief her on the Group's discussions.

Capt. Steinbrugge also provided an update on the Navy's Report to Congress which asks for a five year extension, an exemption for submarines, and some changes for special areas management. He noted that the Navy is in the process of sending the Report to Congress through the proper channels to obtain clearance for its release to Congress. He stated that he and the other Navy staff would welcome the Group's ideas on a legislative approach.

In terms of the five year extension, he observed that some people view the Navy's inability to comply with the five year deadline as a failure. From his perspective and that of many others, the extension is not seen as a failure since when the law was passed, it was known then that an extension would be needed.

Next, since there were several new faces at the table, Michael Lesnick asked each Dialogue participant to introduce themselves and their organizational affiliation. During the introductions, Elsie Munsell, Deputy Assistant Secretary of the Navy for Environment and Safety, stated that she is looking forward to receiving the Navy Plastic Dialogue Group's advice. She also noted that Rear Admiral Walker, Director, Environmental Protection, Safety and Occupational Health Division, would be joining the group at lunch time. She stated that his appointment and the creation of his position with its focus on the environment is significant and shows the importance of the environment to the Navy.

Michael Lesnick then identified the key objectives for the meeting which were to: hear what the Navy has been doing to reduce and manage plastics upon Navy ships; receive reactions and

suggestions from Dialogue participants; consider additional outreach by the Navy; and, consider next steps to undertake. He then commented that it was good to see everyone again. He noted that the Dialogue Group has worked diligently over the years and reached the stage where they could be frank with each other. Although the Dialogue Group had not met for over a year, he suggested that Group members should try to honestly state their reactions and opinions. He then urged the Navy staff to keep their presentations short and crisp and the non-Navy members to be concise with their questions. He cautioned everyone to be careful about their use of acronyms.

The first presentation was by Jill Ballard of Naval Supply Systems Command (NAVSUP). She is the Branch Head of the PRIME (Plastics Removal in Marine Environment) program and the Navy's packaging program. She distributed a handout which outlines what NAVSUP and PRIME have accomplished in terms of reducing the amount of plastics used on-board ship. (See Appendix A.) As a part of their efforts, NAVSUP is working with the other Services to reduce plastics packaging because together they will have greater purchasing power. They are also working with the Defense Logistics Agency (DLA) to change packaging and supply standards to reduce plastics since many of the items used by the Navy are acquired through the DLA.

In terms of product development, in the last year, PRIME has introduced several new items. One is a 100 percent paper hot drink cup. Most commercial paper hot drink cups have a thin plastic coating which prevents them from being pulped. PRIME worked directly with the Sweetheart Company to develop the new cups. The previously used styrofoam cups were approximately eight percent of the waste stream. It is estimated that by using the paper hot drink cups, 62,000 pounds per year of shipboard plastic waste will be avoided. In addition, the paper cups are cheaper to buy- $27.80 per case of paper cups versus $42.09 per case of styrofoam cups.

Other new products include concentrated cleaning products in water-soluble pouches are color-coded to distinguish them from each other. When they are used, the pouches are dropped into water, the pouch disintegrates, and the resulting solution is ready to be used.

PRIME is also testing a number of products such as refillable aerosol bottles, paper packing list envelopes, and alternatives to stretch wrap. They are also doing research and development on items such as alternative milk bladders (in conjunction with Natick Laboratories) and reusable and refillable packaging.

Ken Smith from Naval Sea Systems Command - Engineering, Design and Equipment Installation made the next presentation. His office is responsible for overseeing and scheduling the installation of the various machines (the plastics processor, the pulper and shredder). To facilitate the process, installations will be done when the ships come in for other maintenance (industrial availability). Appendix B is the handout distributed by Ken Smith. It includes the installation schedule.

Based on the number of ships which will be in service in 1998, Smith observed that the Navy will have 38 ship classes and 305 ships which will need to have installations. Each class of ship will require a different installation.

He commented that if the number of ships in service decreases, the total cost of installing the plastics-related machines will decline since less machines will be needed. However, he noted that it will not necessarily change the pace of industrial availability because the money associated with the decommissioned ships will be deleted from the budget. Thus, new openings or slots for installation will not open up. He noted that half of the ship modernization budget is going to solid waste management in 1997.

In general, people inside the Navy feel that the planned installation schedule is unrealistic, while those outside wonder why it is taking so much time for the Navy to comply. He feels that everything is proceeding as planned and will meet its schedule. He reiterated that the Navy staff is committed to having all the various pieces of plastic-related equipment on-board the entire fleet of ships except submarines by 1998.

Next, Craig Alig, Head - Environmental Protection Branch, Naval Surface Warfare Center, Carderock Division, presented a status report on development of the various machines: the pulper, the plastics processor, and the shredder. To put this effort in perspective, he noted that their effort is constrained because of the limited space on Navy ships. Thus, all machines have been designed to use as little space as possible. Additionally, since all of the machines must be taken on-board ship through small doors and passageways, they have been designed to be assembled in pieces.

The Pulper - Alig then explained that the pulper is similar to a large garbage disposal which will grind up almost any material. The pulper will accept items the size of a "Xerox" paper cardboard box. It has a 1/4 inch hole sieve in the bottom which means that nothing larger than 1/4 inch is pumped overboard. The goal for the pulper is to process 500 pounds per hour. As a safeguard, any plastic put into the pulper by mistake settles to the bottom of the sieve and is cleaned out manually. Additionally, the pulper has a "junk box" which collects glass and other non biodegradable material placed within the shredder from being discharged.

The pulper discharges 100 gallons per minute. Alig noted that at the point of discharge, a slight discoloration is visible. The material discharged is negatively buoyant. A primary benefit of the pulper is that it allows pulpable materials to be handled only one time. Previously, such materials were stored on the fantail of the ship and then thrown overboard after flight operations had ceased.

Alig estimates that the pulper will process 70 percent of a ship's waste by weight. As a result, they have concluded that a compactor is not needed as a part of the solid waste management system.

For smaller ships, the Navy has developed a smaller pulper which has a .53 scaling factor. It was developed in 10 weeks. In the laboratory, the smaller pulper will process 150 pounds per hour. Due to its smaller size, the smaller pulper will fit on all ships except for coastal patrol boats.

To test the pulper in a real world situation, it was installed on the USS Roosevelt. During installation, they encountered problems with overhead clearance. Since installing the pulper, they have processed over 1,000 pounds per hour of food and solid waste which exceeds the goal of 500 pounds per hour. At this time, the pulper on the Roosevelt has run for 3,000 operating hours usually for 12-18 hours per day. The plan is to have three pulpers on an aircraft carrier so that it is not necessary to run the pulper at such high levels.

The Shredder - Next, Alig noted that the shredder design has been altered since the Dialogue Group saw the laboratory model. It was changed to provide easier servicing. The shredder is intended to handle metal and glass. The Navy will develop a standardized configuration for the shredder which will allow installation to be standardized.

The Plastics Processor - Next, Alig outlined the evolution of the plastics processor since the Dialogue Group had visited the laboratory. First, he noted that the plastics processor has been designed to take into account different geometries of waste, different types of plastics and food contaminated waste which are found in the waste stream. The machine results in a 30-1 reduction in volume which facilitates on board storage of the plastic.

The process has two components. First, the plastic is shredded. Next, shredded plastic is heated enough to melt polyethylene but not enough to volatilize it. The melted polyethylene acts as the glue to hold the shredded plastic together. The resulting block of plastic is cooled and then stored for disposal on shore. Some plastic types within the waste stream are not melted. The surface is heated to 325 degree F and the interior to 220 degrees F.

To test the plastics processor outside the laboratory, a plastics processor was installed on the USS Arkansas and operated for 8-12 weeks. The machine made 2 foot by 22 inch square blocks. While the machine worked well in the laboratory, it was less successful on-board ship.

After the test on the USS Arkansas, the Navy looked at three commercial technologies and one Navy design. After assessing each, the choice was between one commercial technology and the Navy design. Each was tested. The commercial design operated for three weeks and then began to have problems with reliability.

Given their experience on the USS Arkansas and with the commercial processor, the researchers decided to re-think the machine's design. As a goal, they set out to make the simplest machine possible. They decided to eliminate the automation feature since the crew was not using it. They also decided to have the processor produce a smaller block of plastic. The result is a machine which makes 2 inch thick, 20-21 inch diameter circles and can handle approximately

20 pounds of plastic per hour. To save space and simplify the machine, they utilized the same shredder as for metal and glass. Unlike the original machine, it is separate from the processor. The compartment will have two types of machines: the shredder and the processor. It will have three plastics processors which will have the same footprint as the previously designed machine.

Commander Phil Pfeil, Environmental Afloat Officer, U.S. Atlantic Fleet, spoke next. He began by noting that the Navy has two fleets: Atlantic and Pacific. He noted that in the past two years he has seen an acceleration of attention to environmental concerns in both fleets. The fleets are increasingly aware that they must comply with environmental regulations and are taking the necessary actions to comply. He feels that the Navy chain of command has been and is an asset in achieving environmental compliance.

The focus of the fleets is on the sailors and the ships. Beyond the management of plastics, sailors must be conscious of a wide variety of environmental regulations which affect the waste stream on-board ship. In terms of environmental demands on the ships and sailors, he considers them from the perspective of ships at sea since that is the more difficult task. Because the ships have access to disposal facilities on land, complying with environmental requirements while ships are at the pier is easy. At sea, it is more difficult primarily due to space constraints.

Cmdr. Pfeil noted that the fleets are trying to use "incidents" such as the publicized examples of sailors allegedly throwing trash including plastic overboard as a means to improve themselves. Before coming to the meeting, he called ten ships to find out how they handled their instruction on solid and hazardous waste management. Each ship has individualized instruction which is aimed at all levels of personnel. Nine said that they require an officer to examine trash before it goes overboard. He feels that the sailors are sincerely trying to comply with the environmental regulations.

Cmdr. Pfeil went on to note that the Navy's goal for operating forces is zero discharge of any type of pollution. He does not think it is achievable in this century because the technology is not available. He also mentioned that some ships are burning plastics at sea to minimize disposal overboard.

He identified hazardous materials as the other key environmental focus of the fleets. By the end of 1993, the Navy will have a hazardous materials control center on board each ship. With such a control center, it is anticipated that there will be a 72-84 percent reduction in disposal due to changes in procurement and handling.

DISCUSSION

After the break for lunch, Dialogue Group members were asked if they had any questions or issues to discuss resulting from the morning's presentations. The first question raised was about the use and development of biodegradable plastic utensils which had been mentioned by Jill Ballard from NAVSUP. To some, this seemed to contradict the idea of reducing plastic used

on board ships. A Navy staff person explained that plastic utensils, whether biodegradable or not, are only used when the scullery is not functioning (i.e., in emergency situations).

The next question focused on whether biodegradable materials would be considered to be non plastic resulting in a more lenient definition of plastics being used by the Navy. The possibility that such a definition could have a broader effect was identified as an issue of concern by some Dialogue Group members. The non-Navy members of the Dialogue Group stated that they would like to be consulted as the issue evolves.

Additionally, the use of degradable plastics was questioned because several Dialogue Group members indicated that they feel it does not make sense to promote a "throw away" society. Rather than asking for a general exemption for a category such as biodegradable plastics, several Dialogue Group members suggested that it would be better for the Navy to seek exemptions on a product by product basis.

In response to the discussion of biodegradable plastics, staff from NAVSUP noted that the Navy has pursued two parallel tracks in addressing the plastics problem - changing the amount of plastic which is taken on board ships including the replacement of products with non-plastic equivalents and the development of biodegradable products as well as the development of specialized equipment to handle plastics. The development of biodegradable plastics is part of this effort. The Navy staff stated that the development of biodegradable products such as biodegradable utensils will be helpful to the Navy as it addresses the short term problem of what to do in the interim until the machines are installed on all ships. The Navy staff noted that degradable plastics might be a good option for submarines.

In response to concern expressed about the possibility of excessive use of biodegradable plastic items, NAVSUP staff stated that they have the capability to monitor demand for alternative products. This can be done on a ship-by-ship basis. With this information, if a ship is using "excessive" amounts of plastic, NAVSUP can encourage the ship to change its purchasing practices.

Rear Admiral Walker joined the Group at lunchtime. Michael Lesnick asked him to make a few remarks. He thanked the Dialogue Group for taking time to meet with Navy personnel on these issues. He stated that he is glad to be working on the Navy plastics issue and excited to be part of the Navy's environmental team.

Next, a question was raised about plastic disposal on submarines. It was explained that one half of the waste stream by weight is plastics. The Navy has been working to reduce the amount discharged from submarines. The Navy staff explained that the problem on submarines is that the processes which handle plastics, such as those developed for the other ships, involve heat which impacts the oxygen available on board the submarines. Thus, with current technologies, the Navy has concluded that the focus for submarines needs to be on minimization. They explained that trash on board submarines is disposed of in Trash Disposal Units (TDU). These units are 10 inch cylinders which are closed and weighted. They are released from the

submarine and dropped into the sediment layers. The TDUs have holes in them to encourage decomposition.

On a different set of issues, one Dialogue Group member expressed surprise at hearing that the trash compactor was not being considered as part of the solid waste management system. He would like to see more trash, specifically glass and metal, brought back to shore for recycling instead of being discharged. He strongly urged the Navy to examine recycling.

Craig Alig responded that after extensive analyses they concluded that the compactor was not needed since 75-80 percent of the waste stream is pulpable. The pulper is so effective that he feels that ships will find room for it on board. Additionally, it was noted that the use of the compactor on newly designed ships has not been ruled out.

He commented that the metal and glass which is not handled by the pulper will go to the shredder. The shredder is cheaper than the compactor and gives a 3-1 volume reduction. The shredded material is discharged overboard in a porous bag which settles to the bottom.

Rich Innes, staff to the Senate Committee on Environment and Public Works, provided an update on legislative activity. He informed the Dialogue Group that Sen. Lautenberg plans to introduce a bill to reauthorize the Marine Pollution Act. The bill would tighten up enforcement, captains' logs, and port requirements. As a part of that effort, Sen. Chaffee would like to introduce an amendment which would address the Navy's compliance with MARPOL Annex V by extending the deadline to 1998, defer submarines and revisit the issue in five years, and provide some relief in special areas. However, Innes noted that before Sen. Chaffee will introduce his amendment, the Report to Congress needs to be released to Congress. He also noted that Sen. Chaffee wants to know what the environmental groups think about the Navy's proposal. If major opposition to the proposal exists from the environmental community, Innes feels that Sen. Chaffee will probably not offer the amendment.

Another Dialogue Group member observed that without legislative action, the Navy will have to comply with MARPOL Annex V by January 1, 1994. It was noted that this would be problematic for the Navy.

Someone queried about differences between activities in the Pacific and Atlantic Fleets. It was explained that the Pacific Fleet is following the same rules and regulations and implementing similar purchasing changes as the Atlantic Fleet, and, in fact, they are ahead in their efforts on hazardous materials. Since Desert Storm, the two fleets have been working to make their operating procedures more similar.

Questions were also raised about burning plastic waste on board ships due to concern about the associated toxicity and release of dioxins. When asked about how much burning is occurring, the Navy responded that it is being used infrequently. They noted that sailors are burning plastic waste to minimize the discharge of plastics overboard. Dialogue Group members expressed significant concern about the use of incineration. It was noted that the Dialogue Group had

never discussed incineration (burning) previously because they had thought that its use was not possible. Dialogue Group members raised concern about incineration because of the environmental impacts as well as sailors' exposure to emissions.

Some Navy personnel indicated that they were surprised when they were informed that the ships were burning plastic. They explained that incineration is not in the Navy's plans for solid waste management. They did observe that these incidents do illustrate that the education about plastics has been successful. (Since the meeting the NAVY has issued a message which suspends plastic incineration at sea until a full review of the issues can be undertaken.)

On a different subject, Larry Koss noted that a new round of videos are about to be made. He asked the non Navy participants for ideas or materials they have which could be used to help further educate the sailors.

Next, a question was raised about the incident on board the USS Lincoln where a sailor allegedly went on unauthorized absence (UA) for two months because he could not stand watching "garbage" being thrown overboard. The Navy personnel noted that the situation had been investigated and that his understanding was that nothing illegal occurred. A non-Navy Group member noted that she had talked to several sailors on board the Lincoln and that they said that the 3-21 day rule was being violated. She questioned whether the Navy was following its own rules. From another Dialogue Group member, it was noted that the perception among Congressional staff and members is that nothing is being done about the incident. Several Dialogue Group members suggested that the Navy needs to be more outspoken in its response to such incidents.

It was also suggested that the Navy needs to be more responsive publicly to charges. They also need to define the issue more broadly and that such situations should be turned around to highlight the positive things the Navy is doing. One idea was suggested that the Navy needs to stand behind its program by being accountable through the provision of mechanisms such as a whistleblower number. The Navy staff responded that the Naval Inspector does have such a mechanism with its 800 number hotline.

Captain Tom Ledvina of Navy's Office of General Counsel spoke next on the components of the Navy's legislative compliance strategy. He began by noting that MARPOL is a difficult statute to follow. He provided a handout which outlines the major elements of the Navy's legislative proposal. It states that the Navy is committed to complying with MARPOL, defines what the Navy would like to see proposed in legislation, and outlines monitoring and incentives for compliance. (See Appendix C)

In response, several Dialogue Group members stated once again that Congress needs the Navy's Report to Congress before it can consider an amendment. It was suggested that perhaps the non-Navy participants could assist in helping to get the Report released.

In looking ahead to a potential legislative approach, it was suggested that the Navy should ask for a deferment for a specified time rather than an exemption. On special areas, it was suggested that they should negotiate for what they need not a blanket exemption. It was also suggested that the Navy link its requests for an extension to specific deadlines with a certain number of ships having the machines installed each year. The Navy staff expressed some concern about being too specific in a statute since it is often difficult to identify all possible scenarios.

From a different perspective, it was suggested that having specific deadlines in statute could help the Navy staff responsible for environmental compliance to protect and drive the program. In general, it was strongly urged that the Navy should be very specific about their rationale and need.

Several Dialogue Group members expressed concern about moving any extension through in this Congress given the crowded Congressional calendar.

Broader Outreach by the Navy

Next, Michael Lesnick focused the discussion on the question of whether the Navy should pursue a broader outreach effort on the plastics issue. In response, it was noted that there is a need to educate the new Administration, new Hill staff and new staff in environmental organizations about the Navy Plastics program. It was also suggested that there might be additional people who should be asked to join the Dialogue Group. The Dialogue Group members were asked to let Michael Lesnick or Martha Tableman know of any key individuals who should be considered. The Dialogue Group members also stated that they clearly felt that there were issues remaining to be discussed by the Dialogue Group; incineration was given as an example.

Additionally, several Dialogue Group members suggested that, in general, the Navy should be proactive with good news rather than just reactive to bad news.

Closing Observations

Before adjourning the meeting, Michael Lesnick asked the Dialogue Group for their thoughts. Several stated that they felt that the Dialogue Group should continue to meet. They also specifically suggested the inclusion of representatives from EPA, Coast Guard, Greenpeace, and the House Armed Services Committee.

It was also suggested that the Navy needs to work with AID, World Bank, etc. to illustrate the global utility of the plastic-related technologies developed. It was thought that the global demand from other Navys and other possible consumers of the technologies (e.g., cruise ships) could provide a means and a market to sell the Navy's technology. Specifically, it was suggested that the Navy should make a presentation to the Gulf of Mexico program about potential uses of the technology.

Another participant noted that The Report to Congress and associated legislative activity will serve as a means to educate people.

Michael Lesnick closed by thanking Dialogue participants for responding quickly to our inquiries about dates and their willingness to attend and participate in the meeting.

Rear Admiral Walker thanked the group for letting him attend and be educated about their views and concerns. He appreciated the members willingness to speak frankly and honestly and sees that as the value of such meetings.

Capt. Steinbrugge stated that he felt the dialogue during the meeting had been fruitful and he hopes it will continue with future meetings.

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NAVY PLASTICS DIALOGUE

DRAFT

Meeting Summary

August 17, 1993
Washington, D.C.

The meeting began with Michael Lesnick, The Keystone Center facilitator, reviewing the agenda and asking participants to introduce themselves, their respective organizations and the extent of their involvement in the Navy Plastics Dialogue. (See attached list for those in attendance.) The introductions began with Rear Admiral Walker who welcomed the group, noted that he was glad to be in attendance, and thanked everyone for taking the time to attend the meeting. He then noted that Deputy Under Secretary of Defense Sherri Wasserman Goodman would be joining the group around 10:00 a.m. After introductions by all in attendance, Mike Lesnick observed that he was impressed with the sense of responsibility for the plastics issue and the sense of ownership for what the Dialogue has accomplished from both Navy and non-Navy members.

The first item on the agenda was the Navy's Report to Congress. Tom Ledvina, Navy Deputy Assistant General Counsel, presented the highlights. He noted that the Navy began with source reduction efforts to keep plastic off of ships. NAVSUP has taken the lead on that aspect. Through such efforts combined with the 3/20 day rule which requires food contaminated plastic to held for three days and non-food contaminated plastic to be held for 20 days, the Navy has achieved 70 percent reduction in plastic discharge. That results in 30 percent of the plastic waste generated remaining which must be addressed. The 30 percent consists of food contaminated plastics, necessary plastic items for which there are not currently substitutes and special area discharges. Special areas are a broader problem than just plastics; it includes the entire solid waste stream. Much of the Navy's activities occur in these areas (e.g., Caribbean, Mediterranean)

Ledvina stated that the statutory deadline for compliance with MARPOL Annex V is January 1, 1994. Despite the Navy's best efforts to comply, they will not be able to meet the deadline. The Navy's compliance is constrained by limited space on board ships and the procurement and installation schedules. Limited space and the diversity of ship types has meant that for each type of ship, it must be determined what equipment will be removed to allow room for the plastic processing equipment. Installation of the equipment requires that the ship be pulled out of service. Thus, the Navy is linking installation of the plastic-related equipment to scheduled maintenance, thus, installation is dependent upon shipyard availability. A timeline of five years, until 1998, for installation of the plastics processing equipment on all ships has been determined to be feasible.

Ledvina explained that submarines present a special problem for the Navy due to their greater space limitations and need to control the internal atmosphere. The concern about the atmosphere

means that many of the machines developed for regular ships will not work on submarines because they use heat as a part of the process and as a result emit fumes. The Navy has determined that they will need an additional 15 years for submarines to comply.

Next, Ledvina noted that under MARPOL Annex V, special areas have specific, more stringent standards in terms of discharges for solid waste. Waste materials are supposed to be disposed of at reception facilities on shore. The special area status does not become effective until the reception facilities are operational. The Navy intends to retain plastics on board ship and reduce their volume with the plastic waste processor. In their proposed legislation, the Navy is proposing to use the pulpar for food and other organic materials and only discharge the slurry 12 miles from shore (MARPOL only requires 3 miles).

The Navy is also proposing that the Secretary of the Navy will be directed to issue regulations for other waste streams which are similar to the 3/20 day rule for plastics. The Navy is committed to consulting with NOAA and other agencies in the development of such rules.

Additionally, the Navy's proposed legislation will require the Secretary of Defense to report annually to EPA, NOAA, and Coast Guard on the amount of discharges which occur which are not allowed under MARPOL.

Ledvina noted that the proposed legislation proposes that every five years, the Navy will assess the state of technology available for submarines, ships, and special areas to determine if new approaches are available.

He also stated that to ensure compliance with the five year deadline, the Navy's proposed legislation will establish performance standards for the plastic waste processor which is the most difficult machine to install. These performance standards will state that a certain percentage of ships each year will have the plastic waste processor installed. The proposed legislative language identifies exceptions for occurrences beyond the Navy's control in terms of meeting the interim performance standards. However, the Navy will still be required to meet the compliance date of 1998. Ledvina commented that the Navy's proposed legislation addresses the problems they foresee.

Discussion

With the conclusion of Ledvina's presentation, questions were taken from the group. The first question asked if the review process identified would be more than that provided for under the Administrative Procedures Act (APA)? In response, the Navy staff noted that the type of regulations outlined in the proposed legislation are not the type which normally go through APA. However, on the ones proposed, the Navy would seek public and agency input.

Several members noted that the Navy's commitment to achieve compliance by 2008 for submarines is a major shift and that they are pleased to see the change. The Navy staff noted

that the shift reflects the Navy's commitment to decrease environmental pollution. It was observed that in previous interagency discussions, submarines had been outside the boundaries of discussion. It was queried if the Navy had a specific type of technology in mind to meet that goal. The Navy staff responded that currently they do not have a specific process in mind. The Navy staff do feel that both high and low technology approaches should be considered due to issues of affordability. Examples of low technology approaches which will be considered include source reduction. It was observed that due to the technology problems identified early in the Dialogue Group's discussions, the Dialogue Group had not examined submarines during their previous discussions and that consideration of submarines and their problems might be an appropriate focus for future discussions.

The Navy staff noted that the focus of the Navy's effort to date has been on surface ships because they involve more people and generate more waste.

A non-Navy Dialogue member inquired how the Navy has handled research and development money requests for submarine-related activities when it is not yet pursuing a particular technology for submarines. The Navy staff noted that they have requested specific money submarine research for the out years.

Next, someone asked if the Navy has baseline information for submarine discharges as compared with the total volume of discharge by the Navy. The response was yes the baseline information exists and it is a small amount. A representative of the environmental community noted that having such numbers available to them would be useful.

Deputy Under Secretary of Defense for Environmental Security Sherri Wasserman Goodman arrived at approximately 10:00 a.m. Michael Lesnick welcomed her and asked her to make a few remarks. Ms. Wasserman Goodman noted that it was nice to be at the meeting and that she felt the group was doing important work. She commended the group for working together and remarked that such a joint effort is important for the credibility of the Navy Plastics program. She is supportive of the Navy's efforts on plastics and sees great potential to be derived from the plastics program in terms of technology development and possible transfer to uses elsewhere. She noted that she had been with the President in California the previous few days. As stated by the President, she supports the idea that growing the economy and protecting the environment go hand in hand. The key areas of development and technology she sees are plastics, pollution prevention technologies, and environmental control. To reflect her concerns, she has reorganized her office into four sections: clean up, compliance, conservation and pollution prevention (C^3P^2) As she looks to the future, she sees many opportunities for facilitated meetings between a variety of people on issues under her jurisdiction.

Ms. Wasserman Goodman concluded by stating that she would like to stay involved with the group and she will attend when possible but someone from her office will attend regularly.

Discussion

A non-Navy participant expressed concern that the exemption for special areas is contrary to the purpose for establishing special areas. From her perspective, the international community has already decided that it is not okay to discharge non-plastic waste in special areas. Additionally, she suggested that the proposed legislation lacks justification for the exemption and feels that the Navy needs to provide evidence. It was also observed that the legislation does not address coastal amenities which is part of the reason for establishing special areas.

In response, the Navy staff noted that in the 1973 Convention which MARPOL modifies, public ships were exempted from compliance. Congress went beyond MARPOL in applying the principles of MARPOL Annex V to public ships including the Navy. He also observed that Navy operations do not facilitate the use of reception facilities as a means of disposal in special areas. Due to operational concerns, the Navy cannot always go into such facilities.

Another non-Navy member suggested that the legislation is worded backwards. She would prefer to see compliance required except in specific circumstances instead of exempted except in specific circumstances. She and others felt that the legislation needs to specify the situations where the Navy cannot comply with special areas designations rather than giving a blanket exemption.

A Navy staff responded that it is a question of flexibility; it would be his preference to see specificity in the regulations rather than in the legislation.

Another Navy staff noted that allowing pulpable materials to be discharged in special areas is not an exemption but is a redefinition of what is waste. He feels that the bacteria present in the ocean will degrade the material. He noted that metal and glass is a different matter and that the Navy's goal is to achieve zero discharge. He also noted that discharges will occur 12 miles off shore instead of the three miles required by MARPOL.

A non-Navy member noted that open ocean areas are also of concern to them, so discharging 12 miles out does not make it less problematic. She suggested several options. One would be to have separate standards for special areas; another would be to provide an exemption for wartime, hostile areas, etc.

The Navy staff observed that separate standards are difficult to enforce due to political constraints. Because of the dynamic between Congress and the Administration, wartime efforts are often not given that label. He also noted that there are other non-wartime related efforts which do not allow ships to go into shore to dispose of waste. The example provided was search and rescue.

Another non-Navy member noted that while there appears to be some concern over the proposed legislation there are some definite areas of agreement. The task before the group is to improve the proposal. The environmentalists do not want to impair operations and the Navy is willing

to examine the impacts of the discharge of pulpable materials. One area of agreement identified was that a blanket exemption is not desirable.

Several Dialogue members suggested that the specifics in terms of when an exemption should be granted should be left to the discretion of the Secretary of the Navy.

The Navy provided some examples of situations in which it could be difficult to comply. They are:

- Mediterranean/Baltic - Average Duration at sea: 10-17 days
- W. Africa non-combatant evacuations - Average Duration at Sea: 3.5 months
- Caribbean drug operations - Average Duration at Sea: 62 days

It was noted that for some non-Navy members to feel comfortable with the pulpar, they needed a study by EPA or NOAA which shows that eutrophication resulting from the slurry is not a problem.

Trying to clarify the issues, another non-Navy member noted that there are three problems with the legislation as drafted:

- time - the exemption does not end
- impact - no-one knows
- application - how broad, what is the scope to which this applies.

To correct these problems, she proposed that the time for the exemption should be limited, a study should be done, and regulations issued which specified the application.

It was suggested that qualifying language such as "operational needs dictate as determined by x person" should be added. In response, it was noted that operation dictates would need to be defined and that it would be preferable for someone above the ship's captain to make the decision. In response, several Navy personnel noted that the ship's captain should be the decisionmaker since they feel the ship's captains are working to protect the environment, it involves them in the process, and they are responsible for all aspects of ship management. It was suggested that instances where solid waste would be dumped overboard due to operational constraints could be tracked in a log and that such actions could be incorporated into performance standards for ship captains.

A non-Navy participant noted that having to log an action was quite effective under SARA Title 3 which required companies to provide yearly reports of their toxic discharges. She indicated that she had a lot of faith in these types of annual reports.

Rich Innes, Senate Committee on Environment and Public Works, arrived and announced that he was leaving the Committee to work for BFI and introduced his replacement, John Grzebien. Rich then explained what actions had been occurring on the Hill to address the Navy Plastics

issue. Before the Congressional recess, he had met with a number of people to attempt to draft language for an amendment to the DOD Authorization Bill which would satisfy the concerns of the environmental groups. Betsy Schrader (CMC) and Gina DeFerrari (House Merchant Marine and Fisheries Committee) from the Dialogue Group and other Congressional staff met to draft some language. This group used the Navy's proposed language as a starting point. After that meeting, the legislative language was re-drafted with additional suggestions from people such as Sally Lentz. Innes distributed the proposed legislation. (Included in Appendix B.) The key points of the proposed legislation are:

- Special area compliance must occur by a date certain;
- A study by EPA in consultation with NOAA is required;
- The 3 day/20 day rule is codified'
- An annual report to Congress regarding progress made towards compliance with Annex V; and
- Provides a schedule for installation of the plastic processor on Navy ships with completion by July 1, 1998.

Rich Innes stressed that Senators Chafee and Baucus will need the environmental communities support in order to offer the amendment.

Before discussion could begin on the legislative language proposed by Rich Innes, Ms. Wasserman Goodman had to leave. Mike Lesnick asked her for any closing thoughts. She stated that she was pleased with the dialogue she saw occurring among the participants, felt it was meaningful, and the group was making progress. Ms. Wasserman Goodman stated that she feels that the legislation proposed by Rich Innes and Madelyn Creedon is headed in the right direction. As she stated earlier, environmental protection is integral to our defense. In terms of future Dialogue meetings, she would like her office to be included. She would like to attend herself as much as possible and will designate someone from her office to attend also. She would like to see the group reach a consensus this year so that the Navy can move forward with compliance and technical development. She thanked everyone for taking the time to participate in the Dialogue.

Before Ms. Wasserman Goodman left, Tad McCall noted that with Sherri's arrival at DOD, EPA now feels that DOD is working with them. He provided some examples of such efforts including joint testimony on base closure.

With Ms. Wasserman Goodman's departure, discussion began on the legislative language proposed by Rich Innes. Someone raised concern about whether the Navy should proceed with pulpers before the EPA study is completed. Rich Innes responded that it only applies to non-plastic waste and that the goal would be to get EPA's determination as soon as possible. He noted that from conversations with EPA staff, they anticipate that it will take 1-2 years to complete the study. It was suggested by a non-Navy participant that the legislation needs to specify what type of analysis needs to be done within the study. The Navy noted that while the study is being conducted, they intend to continue with research and development on the various

pieces of equipment. They would stop just short of procurement without the results of the EPA study. At this time, the Navy is estimating there will be six months of time when they will not be able to proceed.

A Navy staff person noted that the Navy would not pursue the pulpar if it could not be used in special areas since they are trying to develop a suite of equipment which can be used everywhere.

Discussion concluded with agreement in principle to the language proposed by Rich Innes with the addition of language discussed which provides for discharge if in the determination of the Secretary of the Navy it is necessary to carry out the mission of the Navy. Before agreeing, dialogue participants wanted to see the actual language drafted. Kathy O'Hara and Sally Lentz volunteered to be the point people on reviewing the legislative language.

Rich Innes reiterated the need for Senators Chafee and Baucus to hear from the environmentalists about their support for the amendment before they would introduce it. The environmental community representatives noted that they, too, will need to justify their support to their constituents. It was also noted that other environmental groups need to be informed of the legislative effort and what the Navy has accomplished. Innes stressed the need for letters of support to be written to Chafee, Baucus, Nunn and Thurmond on the Senate side and Representatives Studds and Young of the House Merchant Marines and Fisheries Committee and Representatives Dellums and Spence of the House Armed Services Committee. Mike Lesnick asked Dialogue participants to please send copies of their letters of support to the Keystone Center staff.

Several participants suggested that a press conference or press release about the Navy's efforts to address plastics management and emphasizes the potential uses for the new technologies should be prepared. Such a press conference or press release would be useful to the Senators, the Navy, and the environmental community. Mike Lesnick asked for volunteers to consider potential steps for addressing public outreach. Kathy O'Hara, Al Manville and Larry Koss volunteered. It was noted that it was critical to have someone from the Hill involved also.

Next Steps

Since the Group had devoted all of their time to the discussion of the legislative language, the discussion of the environmentally sound ship of the twenty first century was postponed. It was suggested that a meeting should be held in the October time frame.

Before adjourning, Rear Admiral Walker wanted to be sure that everyone knew that the group's concern about incineration had been heard and addressed. A message has been sent out from CNO to the fleets which says incineration should not occur until the chain of command has had a chance to review the issue.

Several non-Navy members commented that they appreciated the Navy's quick response to their concerns about incineration. They wanted to know more about the type of review, the time frame and the potential for their involvement in the review. The Rear Admiral responded that NAVSEA has been tasked to do the review and that the timing and specifics had not yet been determined. He did state that the topic of incineration might be a subject for a forum similar to the Navy Plastics Dialogue. Another non-navy participant noted that the David Taylor Research Lab had studied incineration for 15 years there fore further study was not needed.

In closing it was noted that the Navy's response on incineration was a good example of applying the precautionary approach to environmental problems.

Postscript

Since the August 17th meeting, the legislative language was revised several times. The final language (See attached Congressional Record from Sept. 8, 1993) was introduced and adopted on September 8, 1993. It now goes to the House-Senate Conference Committee for the DOD Authorization bill for consideration.

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Report to Congress

U.S. Navy Compliance with the Marine Plastic Pollution Research and Control Act of 1987

June 1993

Preface

The Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA) implements Annex V of the International Convention for the Prevention of Pollution by Ships (MARPOL) as U.S. law. The effective date of the Act for the maritime industry was December 31, 1988, the day Annex V entered into force for the United States.

Annex V of MARPOL prohibits (subject to limited exceptions) the disposal from ships into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, and plastic garbage bags. Annex V also restricts the discharge at sea of other types of garbage to specified distances from the nearest land. Public vessels are exempt from the restrictions but are expected to comply to the extent possible.

Unlike Annex V of MARPOL, the MPPRCA does not exempt public vessels and requires the U.S. Navy, beginning 5 years after Annex V enters into force (i.e., December 31, 1993) to comply with the discharge controls. However, under provisions of MPPRCA, the Congress may modify this applicability to the Navy, based on this mandated Report to the Congress on the Navy's extent of compliance.

This report reviews Navy actions being taken in response to MPPRCA, the schedule for achieving maximum compliance, impediments to full compliance by December 31, 1993, ships that cannot achieve full compliance and recommended measures that will allow for Navy compliance with MPPRCA.

Executive Summary

Navy Actions in Response to MPPRCA

For a number of years, the Navy was developing shipboard solid waste management equipment, in anticipation of Annex V regulations affecting ocean dumping of trash and garbage. However, the MPPRCA requirement prohibiting the Navy from discharging plastic at sea caught the Navy somewhat by surprise because maritime regulations have always recognized the unique operating constraints of the military and have allowed the Navy to comply only to "the extent practicable." Nevertheless, the Navy responded to MPPRCA by accelerating its planned Shipboard Solid Waste Management Program and modifying the program strategy to address the unanticipated plastics discharge prohibition.

From the highest levels in the Navy down to the deckplate sailor, the Navy took unprecedented measures to immediately reduce and eventually eliminate plastics waste discharges from its ships. The Navy prepared comprehensive program plans prior to passage of MPPRCA and issued new guidance and instructions on plastics waste management in 1989.

Navy sailors are now separating the plastic from the nonplastics waste at sea and storing plastics waste on board to the extent practical without impairing the operation of our ships. The waste is then offloaded in port for recycling or proper disposal. The Navy is reducing the amount of plastics taken aboard and developing new equipment for ships to manage what plastics are taken on board.

Navy Program Strategy and Approach

The Navy will comply with and exceed the requirements of Annex V and MPPRCA, subject to the recommended changes, by changing shipboard waste management and supply practices and installing new shipboard solid and plastics waste management equipment.

Prior to passage of MPPRCA, the Navy's strategy for shipboard solid waste management was to direct ships to discharge solid waste only where permitted, and to provide ships with equipment to grind up pulpable waste and compact unpulpable trash into sinkable slugs for overboard discharge where permitted. As early as 1970, the Navy imposed requirements for shipboard solid waste disposal that matched

or exceeded those specified in Annex V (except for plastics). Under the original long-term strategy, plastics waste was to have been compacted along with other unpulpable trash and discharged as sinkable slugs. However, the new restrictions on plastics waste discharge caused the Navy to substantially modify its solid waste management practices and long-term strategy.

Under the revised Navy strategy, the approach to compliance with the nonplastics requirements of Annex V remains the same, except that unpulpable trash will be shredded rather than compacted. For the specific problem of shipboard plastics waste management, the Navy's compliance strategy includes five additional elements:

- Source Reduction (i.e., fewer plastics in the supply system);
- Source Separation (i.e., on-board separation of plastics and nonplastics waste);
- On-Board Storage of Plastics Waste;
- Education of Ships' Officers and Crews; and
- On-Board Plastics Waste Processing Equipment.

Navy compliance with plastics provisions of Annex V will be achieved in two stages: near-term operational and supply system changes to reduce plastics discharges; and longer-term equipment installations to eliminate plastics discharges. The first stage includes the source reduction, source separation, on-board storage, and educational efforts. This stage has been largely completed by implementing new Navy instructions to all ships. Changes in the Navy's supply system to reduce the amount of plastics taken aboard ships have already begun and will continue until all reasonable measures have been taken.

The second stage in the revised compliance strategy is the installation of shipboard metal/glass shredders, solid waste pulpers, and plastics waste processors. This will enable Navy ships to fully comply with

the plastics waste provisions and exceed the nonplastics waste provisions of Annex V.

Schedule for Compliance

The Navy expects to achieve maximum surface ship compliance with MPPRCA and Annex V in 1998. The Navy has given priority status to the program and is working to accelerate development, procurement, delivery, and installation of solid waste processing equipment. Actions are under way to complete or have in progress installations of the Navy's metal/glass shredder, solid waste pulper, and plastics waste processor by the end of 1998. These actions include:

- Accelerating procurement and delivery of shipboard equipment;
- Accelerating development and testing of plastics waste processors; and
- Assigning priority status to equipment installations at the earliest opportunities.

The Navy is committed to achieving maximum submarine compliance with MPPRCA and Annex V by the end of the year 2008. At present, the technology through which such compliance can be achieved has not been developed. Ongoing research and development in shipboard waste processing equipment will focus on submarine and special area discharge requirements.

Impediments to Full Compliance By 1994

The Navy cannot fully comply with zero-plastics discharge requirement of MPPRCA and Annex V by December 31, 1993 because: 1) the shipboard solid and plastics waste management equipment cannot be developed and installed on all ships by that date; 2) food-contaminated plastics waste cannot be stored on board for more than 3 days without unacceptable odors and potential fire, health, and sanitation risks; and 3) suitable nonplastic substitutes for all plastic items, packing, and packaging taken aboard are not available.

Navy Ships that Cannot Achieve Full Compliance

At this time, the Navy cannot foresee any technological breakthrough that would allow ships operating in special areas to fully comply with MPPRCA and Annex V requirements. Ships operating in special areas will be able to comply with the plastics waste restrictions but not fully comply with the restrictions on the discharge of nonplastics solid waste.

Recommendations

1. Increase the period for Navy surface ship compliance with MPPRCA by 5 years.

2. Increase the period for Navy submarine compliance with MPPRCA by 15 years.

3. Change MPPRCA requirements to prohibit discharge of plastics and "floating" debris, rather than the current prohibition of all solid wastes discharges (except food wastes beyond 12 nautical miles) in Annex V special areas.

The Navy supports a national goal of full compliance with Annex V requirements and is working hard to achieve that goal. Beyond Annex V, the Navy has established an objective of achieving environmentally sound ships of the 21st century. The Navy now is taking all reasonable measures to minimize discharges in special areas and from submarines, and will continue searching for suitable technologies that will treat or destroy all wastes on board. The Navy will report annually to concerned Federal agencies on the discharges not authorized under Annex V from submarines and from ships operating in special areas. The Navy will also submit every 5 years to concerned Federal agencies a report reviewing the latest technologies for solid waste management aboard ships, including submarines, and the suitability of the technologies for Navy ships and submarines.

Contents

List of Figures

1. Introduction

1.1 Purpose of Report

This Navy report fulfills a requirement of the Marine Plastic Pollution Research and Control Act of 1987 (P.L. 100-220) that each Federal agency operating ships that may not be able to comply with the requirements of the Act shall report to Congress. The Act directs each agency to report the following:

1) The technical and operational impediments to achieving that compliance;

2) An alternative schedule for achieving that compliance as rapidly as is technologically feasible;

3) The ships operated or contracted for operation by the agency for which full compliance with section 3(b)(2)(A) (by January 1, 1994) is not technologically feasible; and

4) Any other information that the agency head considers relevant and appropriate.

1.2 Marine Plastic Pollution Research and Control Act of 1987

The Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA), signed by the President on December 29, 1987, implements Annex V of the International Convention for the Prevention of Pollution by Ships (MARPOL) as U.S. law, and mandates certain studies of plastics pollution and compliance reports by Federal agencies. The effective date of the Act for the maritime industry was December 31, 1988, the day Annex V entered into force for the United States.

1.3 Annex V of MARPOL

Annex V of MARPOL prohibits (subject to limited exceptions) the disposal from ships into the sea of all plastics, including but not limited to synthetic ropes, synthetic fishing nets, and plastic garbage bags. It also restricts the discharge at sea of other types of garbage to specified distances from the nearest land. Public vessels are exempt from the restrictions but are expected to comply to the extent possible. The basic requirements of Annex V are the following:

- **Disposal of all plastics into the sea is prohibited;**
- **Disposal of dunnage, lining, and packing material that will float is prohibited within 25 nautical miles (nm) of the nearest land;**
- Disposal of food waste and other garbage is prohibited within 12 nm of the nearest land, unless the waste is comminuted and able to pass through 1-inch screens -- in which case, disposal is permitted beyond 3 nm from the nearest land.
- Disposal of all garbage (except food waste beyond 12 nm) is prohibited in the Baltic Sea and other special areas.

1.4 Specific Provisions for Navy Vessels

Unlike Annex V of MARPOL, the MPPRCA does not exempt public vessels and requires the U.S. Navy, beginning 5 years after Annex V enters into force (i.e., January 1, 1994) to comply with the dis-charge controls. However, under MPPRCA provisions, the Congress may modify this applicability to the Navy, based on this mandated Report to the Congress on the Navy's extent of compliance.

2. Navy Actions in Response to MPPRCA

For a number of years, the Navy was developing shipboard solid waste management equipment, in anticipation of Annex V regulations affecting ocean dumping of trash and garbage. However, the MPPRCA requirement prohibiting the Navy from discharging plastic at sea caught the Navy somewhat by surprise because maritime regulations have always recognized the unique operating constraints of the military and have allowed the Navy to comply only to "the extent practicable." Nevertheless, the Navy responded to MPPRCA by accelerating its planned Shipboard Solid Waste Management Program and modifying the program strategy to address the unanticipated plastics discharge prohibition.

From the highest levels in the Navy down to the deckplate sailor, the Navy took unprecedented measures to immediately reduce and eventually eliminate plastics waste discharges from its ships. The Navy prepared comprehensive program plans prior to passage of MPPRCA and issued new guidance and instructions on plastics waste management in 1989.

Navy sailors are now separating the plastics from the nonplastics waste at sea and storing plastics waste on board until it is off-loaded in port for recycling or proper disposal. The Navy is reducing the amount of plastics taken on board and developing new equipment for ships to manage what plastics are taken aboard.

2.1 Immediate High-Level Attention

Prior to passage of MPPRCA, the Assistant Secretary of the Navy for Shipbuilding and Logistics, in October 1987, directed the Naval Sea Systems Command (NAVSEA) and the Naval Supply System Command (NAVSUP) to prepare comprehensive plans of action to control plastics waste discharge at sea. NAVSUP's plan addresses the expeditious reduction of the plastic material aboard ships, with emphasis on initiatives having tangible results by December 31, 1993. NAVSEA's plan addresses the expeditious development and installation of solid waste handling and destruction devices suitable for plastic disposition in a shipboard environment. Although the MPPRCA gives the Navy 5 years to comply with the plastic discharge ban, the Navy has already taken significant steps to reduce the

amount taken aboard ships and discharged at sea. In November 1988, the Secretary of the Navy asked all Navy commands to take the extra effort necessary to ensure the Navy does its part in promoting a clean and safe environment. Fleet Commanders responded by instructing their ships to separate and store plastics waste on board. In March 1989, all U.S. Navy ships began retaining all plastics waste on board for shore disposal, if they are at sea for less than 3 days. If ships are at sea for longer than 3 days, they must retain food-contaminated plastics waste for the last 3 days at sea, and nonfood-contaminated waste for at least 20 days.

To help sailors understand the reasons for, and comply with the plastics waste discharge ban, the Office of the Chief of Naval Operations sent an educational package to each ship. The package contained guidelines, posters, brochures, and videotapes about plastics waste, the Navy's program, and the new requirements.

2.2 Navy's Solid and Plastics Waste Program

Although Annex V of MARPOL exempts military vessels, the U.S. Navy began a long-term program in the 1980s to develop shipboard equipment to manage solid waste and comply with the ocean dumping restrictions on trash and garbage. Historically, the Navy has led the maritime industry in addressing the problem of shipboard solid waste management, primarily because our equipment requirements for size, weight, safety, reliability, and maintenance generally preclude using commercially available waste management equipment.

2.2.1 Program Goal and Objectives

The goal of the Navy's Shipboard Solid and Plastics Waste Program is to enable Navy ships to comply fully with and eventually exceed the requirements of international and Federal regulations that control the disposal of plastics and solid waste at sea.

The near-term objective is to maintain full compliance with the nonplastics solid waste requirements of Annex V and to reduce plastics waste discharges significantly from Navy ships by 1994 (i.e.,

the effective date of MPPRCA for Navy ships).

The longer-term objective is to fully comply with the plastics and nonplastics discharge restrictions of Annex V by the end of 1998, and to exceed the requirements by eliminating the discharge of floatable marine debris from Navy ships.

2.2.2 Navy Program Strategy and Approach

The Navy will comply with Annex V and MPPRCA, subject to the recommended changes, by changing shipboard waste management and supply practices and installing new shipboard solid and plastics waste management equipment on all ships.

Prior to passage of MPPRCA, the Navy's strategy for shipboard solid waste management was to direct ships to discharge solid waste only where permitted, and to provide ships with equipment to grind up pulpable waste and compact unpulpable trash into sinkable slugs for overboard discharge where permitted. As early as 1970, the Navy imposed requirements for shipboard solid waste disposal that were more stringent than those specified in Annex V. Under the original long-term strategy, plastics waste was to have been compacted along with other unpulpable trash and discharged as sinkable slugs. However, the new restrictions on plastics waste discharge caused the Navy to substantially modify its solid waste management practices and long-term strategy.

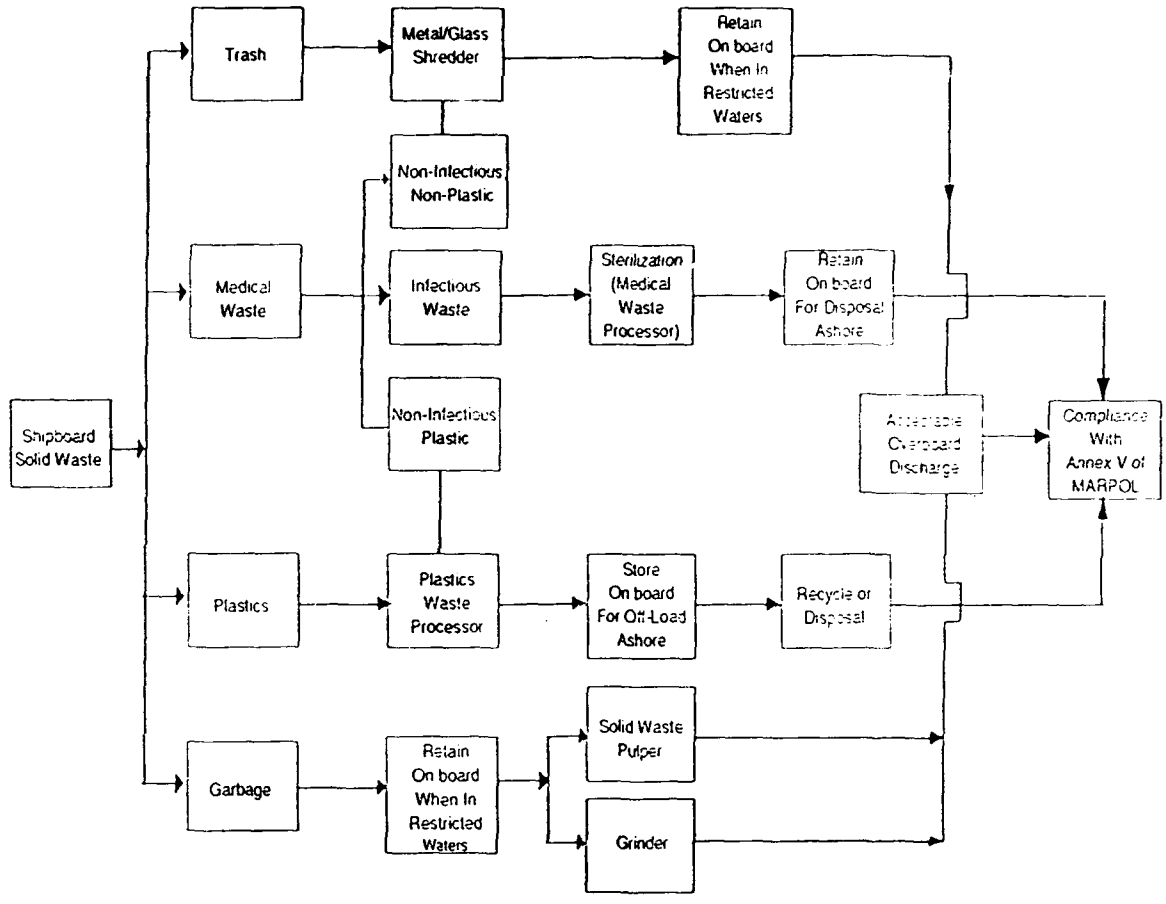
Under the revised Navy strategy, the approach to compliance with the nonplastics requirements of Annex V remains essentially the same, except that unpulpable trash will be shredded rather than compacted. For the specific problem of shipboard plastics waste management, the Navy's compliance strategy includes five additional elements:

- Source Reduction (i.e., fewer plastics in the supply system);
- Source Separation (i.e., on-board separation of plastics and nonplastics waste);
- On-Board Storage of Plastics Waste;
- Education of Ships' Officers and Crews; and
- On-Board Plastics Waste Processing Equipment.

Navy compliance with plastics provisions of Annex V will be achieved in two stages: near-term operational and supply system changes to reduce plastics discharges; and longer-term equipment installations to eliminate plastics discharges. The first stage includes source reduction, source separation, on-board storage, and educational efforts. This stage has been largely completed by implementing new Navy instructions to all ships. Changes in the Navy's supply system to reduce the amount of plastics taken aboard ships have already begun and will continue until all reasonable measures have been taken.

The second stage in the revised compliance strategy includes the installation of shipboard metal/glass shredders, solid waste pulpers, and plastics waste processors. This will enable Navy ships to fully comply with the plastics waste provisions and exceed the nonplastics waste provisions of Annex V. Figure 1 illustrates the Navy's planned shipboard approach for managing solid and plastics waste.

Figure 1 **U.S. Navy's Shipboard Solid Waste Management Strategy**



2.2.3 Navy Requirements

Following the Fleet Commanders' instructions in March 1989 for ships crews to separate and store plastics waste on board, the Chief of Naval Operations institutionalized the new procedures for shipboard solid and plastics waste management in a major revision to the Navy's *Environmental Protection and Natural Resources Manual* (OPNAVINST 5090.1A). The manual requires the following shipboard procedures for managing solid waste.

Trash (Nonplastic)

(1) Plastic trash can liners shall not be used where the trash will be discharged overboard.

(2) Unpulped trash shall not be discharged at sea within 25 nm from the U.S. coastline.

(3) Pulped trash shall not be discharged at sea within 3 nm from any U.S. coastline.

(4) Surface ships equipped with incinerators and/or compactors shall use such equipment to the maximum extent possible with the objective of minimizing trash volume. Every reasonable effort shall be made to package all trash for negative buoyancy prior to overboard discharge. Compacted trash shall not be discharged at sea within 25 nm of the U.S. coastline. No trash, whether treated or untreated, shall be discharged within 25 nm of any foreign coastline. For submarines only, compacted trash that is negatively buoyant may be discharged within 25 nm of the U.S. coastline, but not less than 12 nm from the U.S. coastline, provided that the depth of the water is greater than 1,000 fathoms.

Plastics

(1) Replace plastic disposable items with nonplastic items where possible. If appropriate, remove plastic wrapping and shipping materials from supply items before bringing them on board. Minimize the amount of plastic supplies consumed.

(2) Nonfood-contaminated plastics: Segregate plastics waste and use plastic bag liners for containment. If dedicated space is not available, store on station or in division spaces. When at sea, storage space restrictions may occur. Therefore, retain nonfood-contaminated plastics on board for a goal of 20 days or longer as storage space permits. If at sea for longer than 20 days and storage space is not available, plastics waste generated after the first 20 days may be disposed of beyond

2.2.5 Fleet Operations

As soon as results of the Demonstration Project were available, the fleets took actions to control the Navy's plastics waste discharge at sea. In March 1989, Fleet Commanders instructed ships to minimize plastics waste dumping at sea by making operational changes in the way nonplastics solid and plastics waste is managed on board. Specifically, all surface ships were instructed to follow the 3-day/20-day procedures that were later promulgated in OPNAVINST 5090.1A. An evaluation of ship operating schedules in 1988 indicated that implementation of the 3-day/20-day policy would immediately reduce Navywide plastics waste discharge at sea by 70 percent.

2.2.6 Crew Education

In conjunction with the new policy of separating and storing plastics waste on board, the Navy developed and sent to all ships an educational package to help ships understand the reasons for the new requirements and comply with them. The education strategy focused on motivating the entire chain of command, ships' officers, and ships' crews, by providing justification for and useful information about the new requirements.

The Navy's plastics education package includes guidance material, videotapes, posters, and general literature. A Ships' Guide contains information on the problems caused by plastics in the oceans, pertinent Navy requirements, essential elements of a successful shipboard program, example approaches used on the demonstration ships, and general information about related issues. The guide also includes lists of common plastic and substitute nonplastic items, sample ship instructions to implement the program, and Navy points of contact for further information. To educate and motivate the crew members, the Navy made a 10-minute videotape about plastics waste, the Navy's program, and appropriate shipboard actions. To show support for the program from the top levels of the Navy, the Vice Chief of Naval Operations made a statement on the videotape.

The first educational package sent to all ships was so well received by officers and enlisted personnel that, in 1991, the Navy sent all ships an updated package with a revised Ships' Guide, new posters, and a new videotape.

2.2.7 Supply System

The Navy initiated a comprehensive program to reduce the volume of plastics material going aboard Navy ships, to the extent practicable. The program addresses the three ways plastics materials are taken on board ships: plastic items, plastic packaging, and plastic packing material. The focus is on providing the fleet with substitute nonplastics items and packing/ packaging material where acceptable alternatives exist or can be developed. Supply system personnel have identified plastic items in ships' trash streams and are now searching for potential nonplastic substitutes. The initial effort focused on the plastic items most amenable to immediate replacement. The long-term effort addresses plastic items needing technology development before nonplastic substitutes would be acceptable.

In many cases, identifying potential substitutes is not a simple matter. The substitute must be commercially available at a reasonable cost, must have minimal impact on ship operations in terms of weight and storage space requirements, and must still meet performance standards. As an example, no material except plastic currently provides an adequate barrier for items requiring moisture or electrostatic discharge protection.

After acceptable substitutes are identified or developed, the proper changes in the supply system specifications must be made. Some changes can be made by the Navy alone. Others require the consent of and coordination with non-Navy organizations, such as the Defense Logistics Agency (DLA) and the General Services Administration (GSA). The Navy is working closely with those agencies and industrial organizations to make changes where possible. The Navy has found that it can only exert limited influence over industry where plastic is the material of choice. For this reason, a joint working group with representatives from Army, Air Force, DLA, and GSA has been formed to coordinate efforts with the other military services and present a united position to industry. The initial focus of the joint committee is on reducing plastic packaging in Navy-used items managed by the other services.

The DLA has directed its field activities to reduce plastics in the packaging of Navy-used items. The DLA expects to review the packaging of 635,000 active Navy-used items by mid-1996.

Source Reduction Initiatives

2.2.8.2 Metal/Glass Shredder

The Navy is developing a metal/glass shredder specifically designed for Navy ships. The shredder will ease handling of routine trash and help ships comply with the Navy's requirement to weight discharged trash for negative buoyancy. It will be used to shred all metal, glass, and ceramic waste into a sinkable form to be packed into a paper or cotton bag and discharged overboard where permitted. The production version of the metal/glass shredder will be installed in operating Navy ships by the end of 1998.

2.2.8.3 Plastics Waste Processor

The Navy is evaluating innovative approaches for processing shipboard plastics waste through a multi-phased research and development program. The primary objective is to densify plastics waste and make it safe for long-term storage on board.

In 1991, the Navy designed, fabricated, and laboratory tested two breadboard-level prototypes. In 1992, full-scale development models of the two concepts were designed and fabricated. The production version of the plastics waste processor will be installed in operating Navy ships by the end of 1998.

2.3 Summary of Navy's Accomplishments

Since the passage of MPPRCA, the Navy has made significant progress toward complete compliance with its requirements by taking aggressive actions in the areas of shipboard operations, supply system, equipment development, and education.

Navy ships are currently 100 percent in compliance with the nonplastics waste requirements of Annex V (93 percent of total solid wastes), except in the special areas. Ships are also 100 percent in compliance with the zero-plastics discharge requirement when they are at sea for 3 days or less, and 70 percent in compliance overall.

The Navy achieved this level of compliance beginning in March 1989, when all U.S. Navy ships began retaining all plastics waste on board for at least the last 3 days, and nonfood-contaminated plastics waste for at least the first 20 days they are at sea.

In the supply area, the Navy completed reviewing specifications for 350,000 supply items to identify opportunities for replacing plastic items, packing, or packaging. This effort is being accelerated to complete review of the total number of Navy managed items (672,000) in early 1993. The Navy is working with DLA, GSA, and industry on the enormous task of making changes where practicable.

Navy supply centers are reducing the amount of plastic overwrap and intermediate packaging on supplies sent to ships by switching to reusable containers as much as possible.

In the area of education, the Navy twice sent educational packages to all ships, which included guidelines, posters, brochures, and videotapes about plastics waste, the Navy's program, and the new requirements. Navy schools are adding formal training and awareness about plastics waste to their curricula.

3. Schedule For Achieving Maximum Compliance.

The Navy expects to achieve maximum surface ship compliance with all provisions of MPPRCA and Annex V in 1998. The Navy is committed to achieving maximum submarine compliance with all provisions of MPPRCA and Annex V in the year 2008. Navy ships and submarines have already achieved full compliance with MPPRCA requirements for nonplastics solid waste discharges, but not for plastics waste nor special areas.

Compliance with MPPRCA presents the Navy with an array of problems caused by the different regulations depending on the type of solid waste (plastics or nonplastics solid waste) and geographic location (special areas or non-special areas), and the different types of Navy vessels and their characteristics.

The Navy is giving priority status to the program and is working to accelerate development, procurement, delivery, and installation of solid waste processing equipment. Actions are under way to complete or have in progress installations of the Navy's metal/glass shredder, solid waste pulper, and plastics waste processor in surface ships by the end of 1998. These actions include the following:

- Accelerating developing, testing, procurement, and installation of shipboard equipment.
- Programming for hardware production, acquisition, and ship installations prior to completion of hardware development.
- Assigning priority status to equipment installations at the earliest opportunities, including modifying some ships in advance of shipboard solid waste production equipment availability.

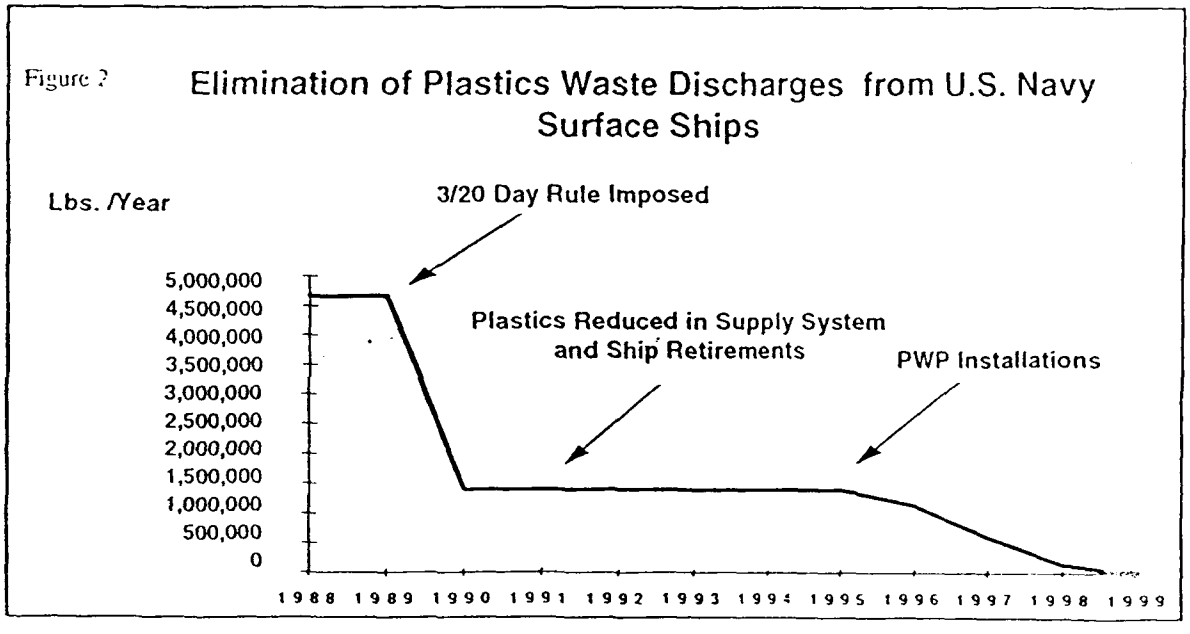
Normally, the development and fleetwide installation of a new piece of shipboard equipment takes 25 years or more to complete because the entire process has prescribed phases and milestones that must occur sequentially. For the PWP, the Navy originally planned to begin research, development, test, and evaluation (RDT&E) in 1990 and complete fleetwide installation in 2001, an 11-year process. The Navy has taken actions that should further accelerate the schedule.

For all three pieces of shipboard equipment, the normal development, acquisition, and ship installation schedules have been accelerated. As an example, the design, construction, laboratory testing, and shipboard evaluation will be performed more concurrently than is customary in Navy R&D programs. The funding and schedules for installing equipment have been programmed, even though the equipment has neither completed development nor been approved for full production. The normal 24-month lead time for having procurement contracts in place before scheduled installations will be reduced. The normal lead time for having equipment "on the pier" before scheduled installation will also be reduced.

The normal 5-to-7 years for fleetwide installations will be reduced by giving priority status to the installation work at the earliest opportunity.

The Navy's overall progress and schedule for eliminating plastics discharge at sea from surface ships is shown in Figure 2.

Figure 2



Additional time will be required to achieve maximum compliance for submarines. Submarines have extremely limited space in which to install waste processing equipment, or to store waste. Furthermore, the atmosphere in a submarine must be very carefully controlled, since that atmosphere supports the crew for as long as the submarine remains submerged. Waste processing equipment that might affect the atmosphere (such as the plastics processor) and waste management practices that might introduce airborne contamination (such as storage of food waste) are therefore impracticable on submarines. New technology must be developed to accommodate the special requirements of submarines.

In the meantime, submarine crews are already removing unnecessary plastic wrappings from supplies before they are taken on board. The amount of material discharged from submarines is small, since the crew size is relatively small (around 100 persons). Solid waste generated at sea is compacted and placed in sinkable metal containers, which are discharged when the submarine is operating either 25 miles or more from shore, or at least 12 miles from shore and in 6,000 feet of water.

4. Impediments To Full Compliance By 1994

The Navy cannot fully comply with zero-plastics discharge requirement of MPPRCA and Annex V by December 31, 1993 because:

1) The shipboard solid and plastics waste management equipment cannot be developed and installed on all ships by that date;

2) Food-contaminated plastics waste cannot be stored on board for more than 3 days without unacceptable odors and potential health, sanitation, and fire risks; and

3) Suitable nonplastic substitutes for all plastic items taken aboard are not available.

4.1 Availability of Shipboard Solid and Plastics Waste Management Equipment

The Navy cannot develop, test, produce, and install on all ships, the shipboard equipment needed for full compliance by December 31, 1993. The three pieces of shipboard solid and plastics waste management equipment (metal/glass shredder, solid waste pulper, and plastics waste processor) are at different stages of development in a Navy laboratory.

The most important piece of equipment for eliminating the last 27 percent of plastics waste discharges is the plastics waste processor (PWP). The PWP is in the third year of an accelerated development schedule at the Navy's research center in Annapolis, MD. The planned schedule for completing development and installation of the equipment is presented in Section 3 of this report.

4.2 Inability to Store Food-Contaminated Plastics On Board

Without proper equipment on board to compact and sanitize food-contaminated plastics wastes, Navy ships cannot store such wastes for more than 3 days without causing unacceptable odor problems, increasing risks of fire and pestilence, and exceeding on-board storage capacity. The Navy assessed various alternatives to discharging food-contaminated plastics waste, including odor-barrier bags, washing and sterilizing wastes, and at-sea waste transfers to garbage

ships. None have yet proved sufficiently practical and safe to adopt as an interim measure until PWPs are installed on ships.

Navy researchers developed an odor-barrier bag that can contain odors longer than 3 days, if the bags are properly sealed. However, the potential problems of on board storage space, fire hazards, health risks and ship safety have not been resolved yet. Sterilizing or washing the wastes to reduce odors has proved impractical as a routine procedure. At-sea waste transfer to other ships for storage and transfer to shore would be impractical and pose unacceptable risks for the sending and receiving ships.

The difficulties and hardship associated with separating and storing plastics waste on Navy warships were illustrated by Rear Admiral J.E. Miller of the Naval Supply Systems Command in April 1990 using the following analogy.

> You and your family set out by car from California to Maine. You have packed very carefully but you have only enough room for you, your family and some luggage, with a cooler loaded with food and beverage for the journey. You also have access to more soda machines and snack bars where you can purchase candy, chips, soups, sodas, and other goodies along the way, which also creates additional trash. For years there's been no problem with trash disposal along the road, but now they have passed a law and you can no longer dispose of your trash; so you opt to hold it until you reach your final destination.
>
> Three days into your trip, the trash is now starting to get a bit ripe and taking over all the foot/leg room you thought you were going to have during the trip. Your riders are now starting to get a little testy over the cramped quarters and the terrible smell. However, the good news is, you're only four days from your destination.
>
> Navy ships were built for combat. All spaces on board are already being used for equipment, spare parts, or providing a home to the sailors. Living quarters are cramped and have

very little personal storage area. Sailors have already given up personal space to store groceries so ships could complete operations without resupply. Now, they are giving up more living space so they can store the trash they once were able to throw over the side.

Odor-Barrier Bags

For the past two years, the Navy has been experimenting with different materials for making odor-barrier bags and different methods for properly sealing the bags. Navy researchers have identified a plastic resin that can be fabricated into bags capable of containing odors from decaying food wastes for 30 days. However, the bags must be sealed carefully and properly. Two researchers were needed to manually evacuate and properly seal a bag using a portable pump and a hand sealer. The researchers did identify and successfully test a commercial machine (costing approximately $8,000 each) that allowed one person to evacuate and seal a bag.

The Navy has demonstrated that special odor barrier bags can contain odors under experimental conditions. However, several practical problems have not been resolved yet. First, the bags are not commercially available and would have to be specially fabricated for the Navy's use. Second, handling and storing large numbers of bags for up to 30 days without puncturing some bags may be difficult to achieve in practice. Third, Navy ships do not have sufficient extra space on board to dedicate to waste storage. Lastly, there are potential health and fire risks associated with storing bags of food-contaminated wastes on board for extended periods.

The Navy plans to continue investigating the issues associated with using odor-barrier bags to store food-contaminated plastics wastes on board for more than 3 days. If suitable storage space can be found on ships and the health and safety risks are acceptable, odor-barrier bags may be an acceptable option.

Sterilizing or Washing Plastics Waste

The options of sterilizing or washing plastics waste are not practical on board Navy ships until PWPs are installed. The existing autoclaves on board ships are located in the ships' infirmaries for the daily sterilizing of medical equipment, clothing, and medical wastes. Even if the units were not being used daily for medical applications, they are too small to process the large volume of food-contaminated plastics waste generated each day. More importantly, routinely carrying food-contaminated wastes into the "clean areas" of ships' medical spaces would pose additional sanitation risks for the ships' personnel.

Washing food-contaminated plastics waste on board using improvised equipment and facilities is impractical, ineffective, and too labor-intensive to be a routine shipboard practice. During the Navy's plastics waste management demonstration projects, Navy researchers experimented with washing food-contaminated plastic wastes from the galley and scullery areas. Just simple rinsing of milk bladders, meat wrappings, cottage cheese containers, yogurt cups, and other plastic food-packaging was very tedious and impractical. Rinsing was ineffective unless each item was fully opened and hand-washed. The grease and oils on meat, fish, and shellfish wrappings were not removed by cold water rinsing.

At-Sea Waste Transfer

The Navy assessed the feasibility and risks of transferring solid and plastics waste to other ships for storage and transfer to shore. The practice, while theoretically feasible, would be impractical and would pose unacceptable risks for the following reasons:

- Mobilizing the waste material topside would pose unnecessary logistical burden, unnecessary personnel exposure to potentially unsanitary material, and dangerous topside clutter for the sending ship while underway;

- Increasing the amount of material transferred by high wire increases the risk of personnel injuries on the sending and receiving ships;

- Extending the "alongside" period of retrograde waste would unnecessarily endanger the sending and receiving ships; and

- Receiving ships would be exposed to unnecessary sanitation risks because the ships do not have on-board facilities to properly store the odoriferous and unsanitary plastics waste.

Garbage Barges

Garbage barges are feasible for waste transferred in port and are used by the Navy in foreign ports. They are not suitable for routine at-sea transfers because towing speeds for the barges are too slow to keep up with ships underway. A fleet of special high-speed garbage ships would have to be designed, constructed, and maintained for the Navy to routinely transfer wastes at sea. Such a fleet, again while theoretically feasible, would be costly and its operation would impose the same logistical, sanitation, and safety risks as retrograding wastes at sea.

The potential number and costs of high-speed garbage ships to service the entire Navy fleet throughout the world can be estimated by analogy to the Navy's fleet of oilers (i.e., Navy ships that carry and deliver oil to ships underway). While underway at 12 to 13 knots, Navy ships typically receive fuel every 3 days from oilers. The fleet currently includes 34 oilers to maintain the capability to refuel ships throughout the world's oceans. If a garbage ship were to accompany each oiler as it delivered fuel, 34 high-speed garbage ships would be needed. The annual cost per garbage ship could be approximately $13 million, which is the annual lease price the Navy currently pays the Military Sealift Command for each high-speed ship that delivers supplies and retrogrades materials from Navy ships at sea. Therefore, a fleet of special garbage ships could cost $440 million per year (once the ships were designed, constructed, and delivered).

Pictured above is one day's worth of galley waste.

With the imposition of the 3-day/20-day rule for Navy ships to separate and hold plastics waste on board, the Navy increased the sanitation and fire risks to ships and lowered morale of the crews because sailors have to store plastic trash in their berthing areas and work spaces. Although Commanding Officers are authorized to waive this requirement if the risks are too great, most ships comply.

Fire hazards are already high on Navy ships because of the tight quarters, industrial and military operations, and large crew sizes. The Navy is continually working to reduce the risks of fire. One of the principal recommendations of the Navy Blue Ribbon Panel that investigated the *USS Stark* incident in 1987, was to reduce fire loads and combustibles on ships. Storing plastics waste on Navy ships is inconsistent with the Navy's goal of reducing fire risks.

The Navy is also continually striving to increase the habitability of its ships as a means of recruiting and retaining high-caliber sailors. Storing wastes throughout a ship decreases sailors' morale, increases sanitation risks, and thwarts the Navy's efforts to increase ship habitability.

4.3 Lack of Suitable Nonplastic Items

The Navy is striving to reduce the amount of plastics taken on board its ships through a variety of measures pierside and by substituting nonplastic items for plastic ones where possible. However, the Navy uses supplies and equipment provided by industry. While the Navy buys large quantities of consumable items, it is still not a large enough consumer to influence market practices. The Navy purchases material and equipment from a number of sources and is constrained by procurement regulations. Supplies are purchased competitively, and economics usually dictates what the manufacturer will choose for packing material—generally plastics.

While the Navy is making progress with substituting nonplastic items, packing, and packaging for plastic ones, the prospects for eliminating a significant portion of plastics taken on Navy ships are poor. The prospects are worse for significantly reducing the remaining plastics waste discharges (i.e., food-contaminated plastics) by substituting nonplastic materials. Plastic packaging of foods is so beneficial for food preservation, freshness, and taste, that the adverse consequences of switching to nonplastics may exceed the benefits of reducing plastics on ships.

5. Navy Ships That Cannot Achieve Full Compliance

Ships Operating in Special Areas

Navy ships operating for extended periods in special areas designated by Annex V cannot fully comply with the nonplastic discharge limitations of Annex V because of insufficient storage space for solid waste. Annex V prohibits the discharge of any solid waste, except for food waste when beyond 12 nautical miles from shore, in designated special areas (e.g., Mediterranean, Baltic, North, Black, and Red Seas, and the Persian Gulf area). Once shredders are installed, Navy ships will shred trash into sinkable forms, but the ships do not have room to store the bagged trash and must discharge them overboard if operating for more than 3 days in a special area. Many Navy ships will have a metal/glass shredder, solid waste pulper, and plastics waste processor. Some smaller ships; however, will be able to only accommodate a shredder or a pulper.

6. Beyond Annex V

To protect maritime environmental quality, the Navy is taking actions that go beyond MPPRCA and Annex V requirements. The Navy has established the goal of achieving environmentally sound ships of the 21st century that will be able to treat or destroy all waste on board. The Shipboard Solid and Plastics Waste Program will eliminate floating debris discharges worldwide. The Navy is also investigating degradable materials and plastics waste recycling options.

6.1 Environmentally Sound Ships

We expect naval ships operating in the 21st century to meet increasingly stringent environmental regulations. The Navy has a comprehensive Shipboard Pollution Abatement Program under way that will enable ships of the 21st century to be environmentally sound. The goal is for ships to operate worldwide without potential for regulatory constraints, inappropriate dependence on shore facilities, or unreasonable costs imposed by environmental regulations. The basic strategy is to:

(1) Design and operate ships to minimize waste generation and optimize waste management, and

(2) Develop shipboard systems that will destroy or appropriately treat the waste generated on board.

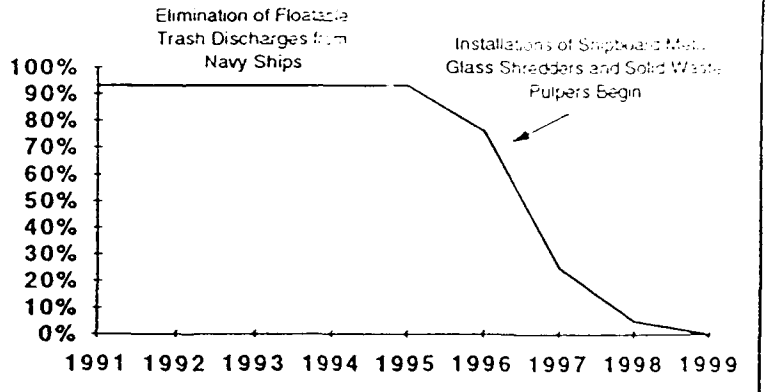
If wastes are unavoidable and cannot be destroyed or retained on board for recycling ashore, they must be sufficiently treated to make all overboard discharges environmentally insignificant. We have not yet achieved the ultimate solution for on-board destruction for any shipboard waste stream, but we have made considerable progress in developing on-board capabilities to treat or process solid waste, oily waste, hazardous materials, and medical waste.

6.2 Elimination of Floating Debris

Although Annex V allows the discharge of floating trash and marine debris beyond 25 nautical miles from shore, the Navy has established its own goal of eliminating ship discharges of floating marine debris. Current Navy policy is that ships should weight discharged trash so it will sink; however, this is often difficult to do without a metal/glass shredder or solid waste pulper. As the Navy installs the shipboard trash shredders and/or solid waste pulpers, ships will no longer discharge trash that floats. The solid waste pulper will pulverize pulpable trash into a slurry that quickly disperses and sinks. The shredder will produce sinkable forms of unpulpable trash. Installation of shredders and pulpers should be complete in 1998. Figure 3 shows the Navy's schedule for eliminating floating trash discharge.

Figure 3

Schedule for Eliminating Discharges of Nonplastic Floating Trash



6.3 Recycling Plastics Waste

Ultimately, it may be possible to recycle the plastic that the ships return to shore, rather than dispose of it in landfills. The Navy is evaluating methods and program options for recycling plastics waste in partnership with the Society of the Plastics Industry Council for Solid Waste Solutions. An initial pilot study was conducted in 1990 to recycle plastics waste removed from an aircraft carrier and other ships. The plastics waste from the ships was washed, separated, and baled ashore, and then transported to a commercial recycling facility where it was made into plastic lumber for picnic tables, park benches, fence posts, and pallets.

The next phase of the Navy's recycling efforts is a larger, area-wide demonstration project around the Norfolk, Virginia Naval complex. The Norfolk project integrates the plastics waste recycling effort with an overall program to improve solid waste management and disposal costs around Norfolk. If successful, the Navy will encourage other Navy facilities to undertake similar programs.

Pictured above is a bench made from recycled Navy shipboard plastic waste.

6.4 Degradable Plastics

The Navy would like to replace current plastic consumable items and packaging with items made of degradable materials if the material performs its function in the shipboard environment. The Navy has initiated a long-term research project to investigate the feasibility of making materials with enhanced degradation rates in the marine environment. The problems to overcome are the numerous types of plastics in common use, the environmental conditions needed for degradation in the deep ocean, the attractiveness of a limited market to potential manufacturers, and the compatibility of degradables with a plastics waste recycling program.

In the Defense Appropriations Act for fiscal years 1991, 1992, and 1993, Congress directed the U.S. Army Research, Development and Engineering Center, Natick, Massachusetts, to conduct research on biodegradable materials to assist the Navy in the control of disposing of plastics waste at sea. Their program activities in development of injection molded and film applications using starch-based polymer blend/lamination technology, include but are not limited to materials fabrication and processing, deep ocean biodegradation exposures, marine toxicity bioassays, nutritional feeding studies, production of end items, and consumer acceptability testing. The Navy is working closely with the Natick facility on this research effort. Pending satisfactory results of the studies, the Navy may find it necessary to further define materials acceptable for disposal under MARPOL.

7. Recommendations

The Navy offers the following recommendations to the Congress:

1. Increase the period for Navy surface ship compliance with MPPRCA by 5 years.

2. Increase the period for Navy submarine compliance with MPPRCA by 15 years.

3. Change MPPRCA requirements to prohibit discharge of plastics and "floating" debris, rather than the current prohibition of all solid wastes discharges (except food wastes beyond 12 nautical miles) in Annex V special areas.

The Navy supports a national goal of full compliance with Annex V requirements and is working hard to achieve that goal. Beyond Annex V, the Navy has established an objective of achieving environmentally sound ships of the 21st century. The Navy now is taking all reasonable measures to minimize discharges in special areas and from submarines, and will continue searching for suitable technologies that will treat or destroy all wastes on board. The Navy will report annually to concerned Federal agencies on the discharges not authorized under Annex V from submarines and from ships operating in special areas. The Navy will also submit every 5 years to concerned Federal agencies a report reviewing the latest technologies for solid waste management aboard ships, including submarines, and the suitability of the technologies for Navy ships and submarines.